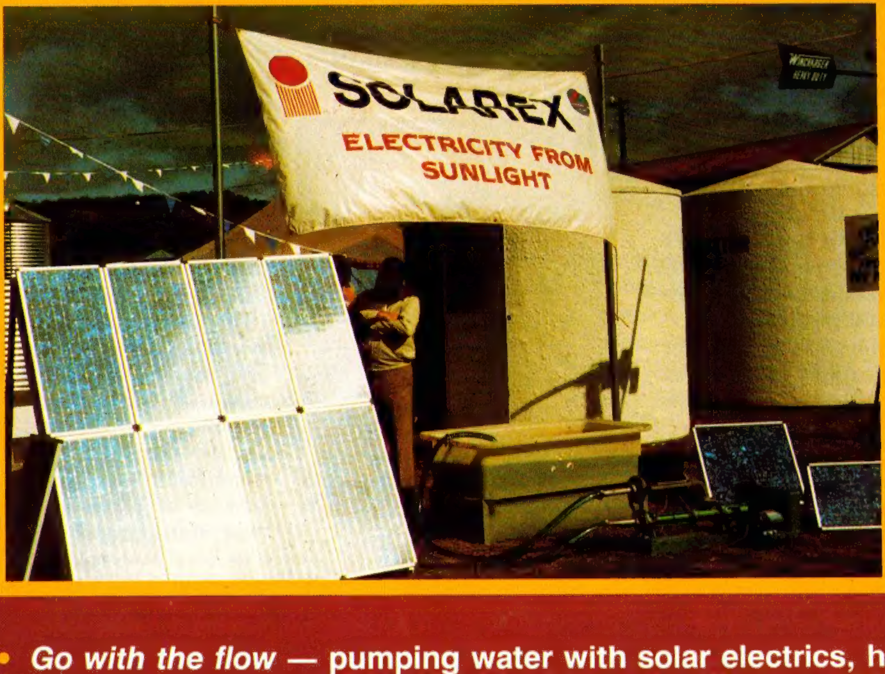
Autumn
No 45 — February, 1985/$2.75*

# EARTH GARDEN

## Water works
(shifting water with sun, wind & water)



- *Go with the flow* — pumping water with solar electrics, hydraulic ram, Platapump, a windmill with rope and pulleys — and gravity!
- The cyclone-defensive house, Brisbane's 'no mains' solar house, mudbrick walls, Melbourne's solar workshop. Peter Pedals on battery problems
- *Tree crops miscellany* — grow bunya nuts, collect eucalyptus seed, propagate bamboo, access to fruit and nut trees, Babaco, siting beehives.
- *Plus* — supermarket survival, a woman goes bush alone, homemade suntan lotion, finding true north, a bird scarer, fruit yoghurt ice cream, computer graphics, access, lots more!

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# EARTH GARDEN BOOKS

*. . . for self reliance. They make great gifts too!*

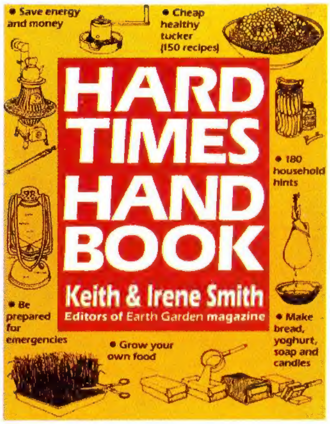
### HARD TIMES HANDBOOK

*Survive — and thrive!*

Keith & Irene Smith

Nelson, 1984, paperback, 204 pages, with 70 illustrations by Elaine Norling, index. Price $7.50 posted.

HARD TIMES HANDBOOK outlines a new, self-reliant approach to city living. How to do more with less, be prepared for blackouts and food shortages, save energy, make money without a job and manage your food supply. Make bread, yoghurt, soft cheese, candles and soap. There are 150 recipes for cheap, healthy tucker and 180 household hints.


• Save energy and money
• Cheap healthy tucker (150 recipes)
HARD TIMES HAND BOOK
• 180 household hints
• Be prepared for emergencies
Keith & Irene Smith
Editors of Earth Garden magazine
• Make bread, yoghurt, soap and candles
• Grow your own food

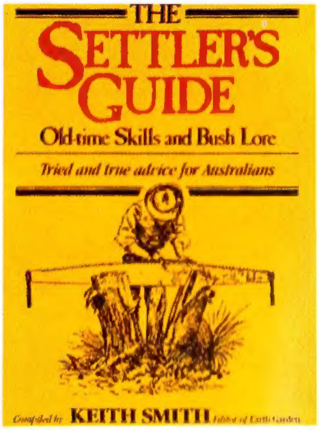
### The Settler's Guide

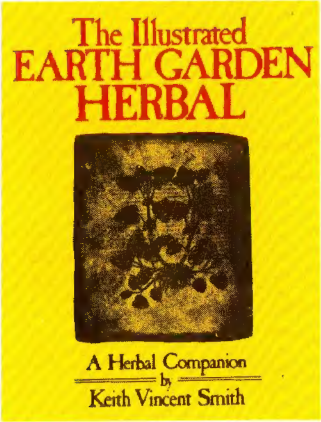
*Old time skills and bush lore*

Compiled by Keith Smith

Nelson, Melbourne, 1983 (second printing), large format paperback, 176 pages, illustrated, index. Price $15.95 posted.

Pioneer a bush block from 'go' to 'whoa'. How to clear, fence, square a gatepost, whitewash, build a slab hut, a rammed earth house or timber windpump, harness horses and select and care for tools like axes, adzes, planes, mauls, crosscut saws and scythes. Tried and true advice from *The Agricultural Gazette* of NSW, 1890-1910.


THE SETTLER'S GUIDE
Old-time Skills and Bush Lore
Tried and true advice for Australians
Compiled by KEITH SMITH Editor of Earth Garden

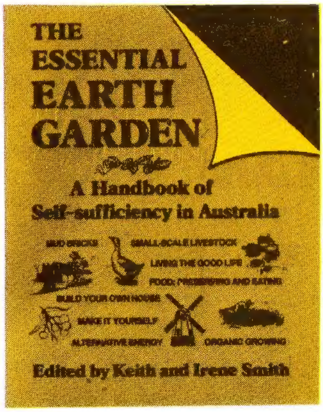


### *The illustrated* EARTH GARDEN HERBAL

Compiled by Keith Vincent Smith

Nelson, Melbourne, 1978, large format paperback, 157 pages, 120 woodcuts, index. Price $9.00 posted.

A quality book, with text and illustrations based on the classic 15th century Herbals. Covers 40 herbs, with a modern commentary, growing tips for Australia and medicinal uses. Dioscorides (60AD), Pliny the Elder (77AD), John Gerard (1597) and Nicholas Culpeper (1653) speak of these beautiful, aromatic plants with delight.


THE ESSENTIAL EARTH GARDEN
A Handbook of Self-sufficiency in Australia
MUD BRICKS
SMALL-SCALE LIVESTOCK
LIVING THE GOOD LIFE
FOOD: PRESERVING AND EATING
BUILD YOUR OWN HOUSE
MAKE IT YOURSELF
ALTERNATIVE ENERGY
ORGANIC GROWING
Edited by Keith and Irene Smith

### The Essential Earth Garden

*Edited by Keith & Irene Smith*

Nelson, Melbourne, 1982, large format paperback, 509 pages, illustrated, index. Price $15.95 posted.

The best of 10 years of *Earth Garden* articles. How to build in mudbrick, rammed earth and stone, grow your own food, keep small livestock, make handcrafts, use solar, wind and water power with many ingenious plans and ideas and lots of inspiration from new settlers. Includes a comprehensive *Access Directory.*

- Or buy the 'big packet' of Earth Garden 1-44. Order form, page 58.

Earth Garden, started in 1972, is the original Australian journal of self-reliance. It is intended as a friendly forum of practical ideas, shared knowledge, sources and alternatives.
It's about putting a roof over your head, growing your own food, using alternative energy and surviving — and thriving — in the city or the bush and the inner changes which follow when you are in tune with nature.

Earth Garden is published each quarter in mid-February, May, August and November. Annual subscription is $11.00.

Published and edited by Keith and Irene Smith.
Illustrations by Elaine Norling.

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We do not accept advertising. That way we are not influenced by any vested interests. Books, places and products recommended are those we think relevant.

Let us lead you up Earth Garden's path to the good life!

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# EARTH GARDEN 45

### The cover

*Front:* Top — Whoosh! Shifting water with water using an hydraulic ram (left) and a noria (right). We explained how the noria works in *Earth Garden No 11.* This one, at Murcia in Spain, was built during the Moorish occupation of Andalusia (711-1492).
*Below:* Pumping with the sun, using photovoltaic cells (left) and with the wind using a windmill and pulleys (right).

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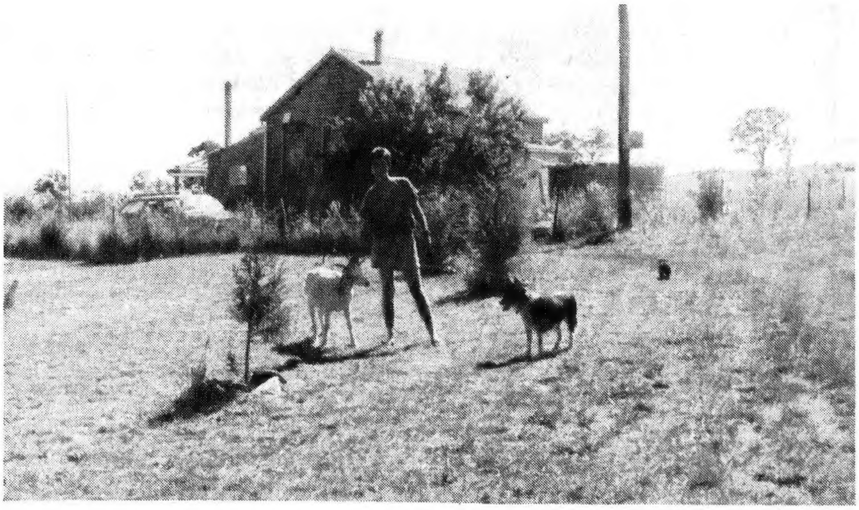
# Going bush alone

**By Kate Matilda**



*Life in the bush for a woman alone?*

Over the last couple of years I have been asked about this many times by my city sisters, so this article has been germinating slowly in the compost. My intention is to give you an idea of what to expect from country life, what it's like being a solo woman in the bush, making the break from the city and some of the more practical aspects of finding shelter and making money.

First, if you'll bear with me, a few snippets from my background. Apart from six months in the west at the age of eight, I am city born and bred. I'm in my mid-30s and although I've had a chequered career, it's been mostly public service. Like most of you I was not raised knowing how to shear sheep or drive tractors as a child. I enjoy live music, dancing, dinners, films — none of which are available here. However, I've always tried to grow vegies and herbs in backyards and balconies and I've done a bit of woodwork and other crafts, which has taught me how to use my hands and occasionally my feet.

My initial break from the city (Sydney) came about when I got a job with the College of Advanced Education (CAE) in Bathurst. This meant regular work and living in the country (joy, oh joy) as I rented a farmhouse. For various reasons it didn't work out, but I did find and buy my present home then, an old country school (a two-room shell) on two acres. The school was advertised by a local real estate agent, but I believe it is still possible to pick these places up in isolated areas where there are not enough kids to keep the school open through the Education Department. The sale is usually by tender.

So I had a foothold in the country, but one which needed a lot of repair and renovation to make it safe and comfortable. It took me another five years of moving back and forth between city and country to finally come to terms with myself as a bushie.

What kept driving me away from here was the lack of money, which I thought I could only earn in the city, and the isolation. I don't know of any other new settlers in the district and especially not single women. Now, however, there is a lovely small network of letter-writing bush women across Australia for support and solidarity.

What kept bringing me back here was a simple love of the bush. Being able to see 50 km broken only by trees, hearing only the sounds of the Mother Goddess — thunder, wild ducks, wind in the pines, foxes calling at night and blowflies(!), breathing only pure air and drinking non-manipulated rainwater.

It sounds rather bucolic. My soul-mates were not so enchanted and could not think of leaving the delights of the city, so I had to go it alone. My last retreat from the city has made me realise that this time it's final because I simply stress-out from noise and other stressed-out, speedy people. Now I also know how to earn a living here and the postie brings me fe/mail every day. It isn't paradise though. There's blowflies, bitterly cold winds, frosts after the summer vegies have sprouted, tiger snakes, mice and worse, flooding rains followed by drought. However, I consider all that to be a small price to pay for the personal space and sense of achievement of country living.

If you feel you really want to move out and you don't have a companion to go with you, it's still possible. A dog or a cat (desexed please), chooks and ducks, books and mail, will go a long way towards reducing the isolation. Remember too, that it costs no more to have the phone connected in the country than in the city, even though Telecom may have to dig up half a mile of paddock to reach you. Then one day, when you're sitting spinning, thinking of nothing in particular, some wandering fairy godmother will hear of a wild woman who lives up on the mountain, and you'll be alone no more. It obviously helps to fantasise a bit.

*What's it like being a lone (not necesarily lonely) woman in the bush?*

Is it you, or not? Do you dream of more space, less noise, dark nights, trees and clean air? I ached to move out of the death race of the city and into the space of the country, but even so, I had trouble adjusting for a while. There are not a lot of people once you move out of the major population centres and a lot of them are very old-fashioned, racist and sexist. They don't have a lot of new things to talk about, so they gossip freely, especially about any newcomers. Most have never been confronted with an active form of feminism before, although I think the message is starting to get through. You will have to like your own company, but it's amazing what discoveries you'll make about yourself and what you are capable of doing.

It's essential to have at least one protective dog. Word gets around fast that there's a woman alone nearby and you might strike a bit of trouble from young, bored males. The older farmers are usually too busy being farmers to bother you. I haven't had much trouble here, just a couple of daytime callers who probably thought I'd be pleased to see them and invite them in, but the dog soon told them that I wasn't all that interested. I have a friend in Victoria, however, who has had quite a lot of trouble and she now keeps a loaded rifle handy.

I think the older, more established areas are safer than the new hobby farm developments, but I may be proved wrong one day. Places like the RSPCA and Animal Welfare have adult dogs who really appreciate the chance you are giving them, but be careful of potential sheep-killers among them. Be wary of Shepherds and sheep dogs like Kelpies and Border Collies. It's nice to know that there is a friend outside who can see and hear further into the darkness than you can.

The chances are that the place you find to live in will be in need of a bit of running repair. Mine needed a complete overhaul. You will have to be handy with all kinds of tools and a bit of an inventer to rig up alternative repair devices. Hardware store people can often be of use if you describe the problem to them. Actually knuckling down to doing it though is all yours.

I thought I was so tough when I brought home my chainsaw. It took me another week to dare to start it. If you choose cold country it's amazing how much firewood you will consume. I spent an enormous amount of time initially finding suitable wood, carting it home, then sawing and splitting it. Heavy work for one woman and I would always run out on the coldest, snowiest day. Now I compromise and in winter pay $30 a ton to a local to deliver firewood to me.

The forces of Nature can be a bit frightening at first. There's nothing to modify her in the bush, the way tall buildings and the presence of other people do in the city. I used to lie awake at night knowing that the roof would blow off in a bad storm. Of course, it never did and I have learnt to ignore it now.

Bushfires can be started by lightning strikes or clowns burning off and are terrifying to control alone. It's pretty bad, even when there are three or four of you. There is often a local bushfire brigade which will usually, though not always, come and be of more or less assistance.

I have a very long hose, about 100 metres, which will reach a long way past the house. I also keep the grass mowed or chewed down (sheep do it, I don't have to wear my own teeth down) for a width of 20-30 metres around the house and around some animal yards. Heavy rains, floods and drought all have to be taken in your stride. There is no point in getting mad at the Goddess Nature; you will learn to respect her.

Death is very much a part of life in a rural area too. I often see stranded animals that are ignored. It used to upset me tremendously and I was always ringing the property owners about them. Death brings blowfly problems too, with a constant buzzing around the house for a large part of the year. They come inside through the smallest cracks, or down the flue and not just one or two, but up to 50 at times. Blowflies are a basic part of the Australian bush and as such have to be tolerated and worked around. Putting out traps for them helps a little. Also being vegetarian won't attract them the way a baking leg of dead sheep does.

The dark nights, the quiet and stillness of the country, can make people apprehensive. There are no street lights here and few cars or other familiar noises. Some nights when the moon is showing her dark side, it is black, black, black. A plus for those nights is the incredible star pattern. There are trillions more stars visible in a country sky than a city one.

A few other little worries are snakes and spiders, etc. They are fears to be worked through, and if you are going to move out, there are a lot of things you will have to work through. I don't kill, but observe (at a safe distance). That way I have become familiar with their habits and what they are useful to keep around for. Avoidance is sensible. Get good boots, gloves, cut the grass and keep your eyes open.

All of these things can seem to take on a greater significance when you are alone, but it all depends on you as to whether or not you will ride with it, or let it all get out of hand. Sometimes, I must admit, I don't even **like** living here. Then there are moments, long moments, each day that I know to the depths of my being that it is right to be here. Just now two Kookas in an old dead tree nearby laughed at me. I looked up and saw the hills, extending out forever, in the morning light. This is just one of those moments.

Is there anyone still with me? Do you wonder why I persevere? The gains far outnumber the losses in spite of, and at times because of, making it alone. When one is alone, not spending each day in a mindless activity just to pay the city-inflated rents and prices and not being constantly interrupted or bombarded by propaganda of all sorts, there is time to think. To stretch, relax, to just *be.*

I feel no need to meditate here, my whole waking self is spent in contemplation deep within. In my first year here I underwent so many metamorphoses, peeled off so many layers of the onion. There were times that were exciting, joyous, and other times that were frightening, almost overwhelming — but at no time was it numbing, dumbing.

It's a good time to keep a journal. That way you help yourself sort through problem areas. I have a mythical three wise women that I write to. It is surprising just how much there is to find out about one's own true self when sitting quietly contemplating while weeding the vegies, repairing the fence, planting trees, kneading bread or simply sitting, listening to the rain and watching the fire die. That whole unveiling, exploratory, rebirthing process is so strengthening that I would like to see every woman go through it.

Of equal importance to the discoveries is the tangible sense of achievement at the end of the day. In the usual

9-to-5, go-to-work-come-home-socialise-enjoy yourself routine, I always wondered what was missing. I learnt that entertainment as such is an artificial construct, manipulated to squeeze your dollars away and use up time that can hang heavily when not directly involved in your own survival. So much of country life and time is spent on direct survival, growing your food, caring for food animals such as chooks and goats, finding and cutting fuel for heating, building your own animal shelters, nurturing trees that will in time feed you, spinning and weaving your clothes, making your bread, cheese and yoghurt.

At the end of each day I am exhausted, too tired to watch television or look for other stimulation and I sleep the sleep of the newborn. There's no need for brandy or Serepax to unwind me and my sleep is not broken by the noise of unmuffled motor bikes, container trucks or garbage disposal machines. I keep a farm journal and at the end of each day write in it what I've done that day, what sprouted from the soil, how many eggs were laid, how much rain, if any, and what new ideas I came up with. The page is filled each day wtih accomplishments and I feel I am not just a passive piece of flotsam on the river, but am actively charting and pursuing my own destiny.

There's time also to dream and to plan — fields of lavender, herbal surprises, rock octagons, goat breeding — and know that it is all possible, after a few more pots of tea, to think about it. There is no hurry.

If any women would like to extend this into a more personal rave with questions or thoughts that I have not raised, feel free to write. If any women would like to come and see for yourself what it is all about, see whether country life attracts you or not, and be warned some of my practices are a little unusual, then drop me a line. I can always do with an extra touch of woman-power with the more awkward jobs. I occasionaly need a farm sitter too, as a goat and poultry can't be left more than overnight. And, I just love writing to other bush spinsters, so if you are another woman alone in the bush, let's swap bantam jokes and herb seeds.

*Kate Matilda, c/- Post Office, Mt David, via Bathurst, NSW, 2795.*

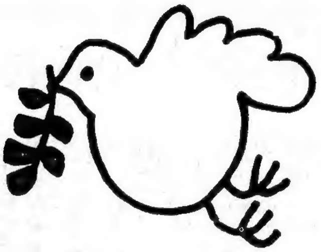
## FRUIT YOGHURT ICE CREAM

2 cups sliced fresh peaches
or berries or pre-soaked pureed dried fruit
or crushed pineapple
(any fresh fruit or a mixture)
1½-2 cups yoghurt
4 tablespoons honey, or to taste
⅓ cup fruit or orange juice

Blend all ingredients at low speed until smooth (about one minute). Turn into freezing tray. Freeze. Beat once or twice while freezing.

If you don't have a blender just mash the berries or mince fruit and blend well by hand, or use an eggbeater.

**Barbara Greaves, Tammin, Western Australia.**



## CONFEST FOR PEACE

*By Marian Gillians*

We went to the *1984 Down to Earth Confest* with good feelings, following a successful 1983 festival, and we were not disappointed.

For us there was a real feeling of peace, which co-incidentally was the theme of this Confest.

Coming from the hustle and bustle of city life it was so beautiful to be able to unwind and flow with events as they happened, rather than pre-planning every move, which tends to happen in my everyday life.

The Confest site was set up as a self-managing community made up of various villages, such as a spiritual village, a healing village, marketplace, women's village, children's village and camping areas.

This time we found ourselves mostly attracted by the healing and spiritual villages. We found it a marvellous opportunity to sample a range of different healing and spiritual understandings which may not have been readily available to us at home. However, the first talk we attended was by John Robins, who was talking on native plants in Australia and the danger of them becoming over-run by exotic species, which added a new perspective for us to that of straight permaculture.

The workshop on spirituality, sexuality and healing was popular and continued each day, with a stampede to the river to allow people to cool down. Without planning it, we got involved in the re-birthing group in a shady hollow and experienced the release of energy in our bodies using a very simple breathing technique (it seems the most effective things are often so simple).

At times there were some amusing clashes between workshops. It was hard to talk sensitively about inhibitions when confronted with loud angry noises coming from the 'anger release' workshop just over the way!

The talks each day on natural vision were beautifully presented and it was so refreshing to practice the simple technique of sunning one's eyes.

### The snoring monk

One morning, caught up in the enthusiasm of the place, we groped our way across the village at an unearthly hour, past a group of musicians and others who seemed to stay awake all night involved in the jungle beat, only to find a snoring Buddhist monk where the meditation was supposed to take place.

It's good to know that Buddhists also find it hard to get up at times! We left him to his dreams and waited for the Ontos Yogaville people to commence their group meditation at the more reasonable hour of 5.30am.

We decided to stay an extra morning and overheard a lady talking about possibly giving a workshop on crystals. She had apparently not come to do workshops, just to sell a few crystals at the village, but had somehow been drawn in.

It was a perfect conclusion to a most stimulating week and we went away buzzing with new ideas to be followed up later.

# Travel notes

## TREKKING TO THE TOP

Involvement with adventure travel took Tim Macartney Snape to the top of Mt Everest in October last year with fellow Australian climber Greg Mortimer.

Tim is a director of Wilderness Expeditions, which offers among its many treks the chance to visit the base camp at Everest (if not the summit) or to walk along other remote Himalayan ridge-tops near Annapurna . . . or ski the hot spring mountain resorts of Japan, cycle through China, raft down the white waters of the Tambo Kosi in Nepal on the Dumoine River in Quebec. Tim will lead some of the 1985 treks.

Send for the **Adventures International** brochure (or the **Summer '84/85** adventures brochure of windsurfing rafting, kayaking and rock climbing inside Australia), from Wilderness Expeditions, 10th floor, 2 O'Connell Street, Sydney, 2000, or 26 Sharp Street, Cooma, NSW, 2630.

## CYCLING INNER MONGOLIA

Robert Fletcher of Tail Winds Bicycle Touring led the first group of Australian cyclists through the grasslands region of Inner Mongolia in late 1984, following the Winding Road through the area once roamed by Genghis Khan's tribes before the 13th century conquest of China.

The next 26-day trip, departing June 2, 1985, includes around 40 km of cycling per day. "In the country we will stay at guest houses or in traditional yurts. We will also share the traditional diet of mutton and milk products," the brochure reads. Price is $3,420 including accommodation and meals.

Further details from **Tail Winds,** GPO Box 930, Canberra City, ACT, 2601.

## OFF THE BEATEN TRACK

My feet began to itch as I saw the Sahara sandhills unrolling again in Iain Finlay and Albie Falzon's superbly filmed documentary *The Road to Timbuktu* on ABC television on Christmas night. It was a nostalgic reminder for me of the same journey I described in *Earth Gardens 41 and 42.*

Now if I didn't have to produce *Earth Gardens 45-48* this year (and a book or two), I would be off like a shot on Australian Himalayan Expedition's Inca Expedition which takes in Easter Island, Macchu Picchu, the Inca Trail, Cuzco and Lake Titicaca in 40 days (17 days trekking), leaving in either May, June or September, or maybe on the Central Asia Trek, or Tibet in May, or . . .

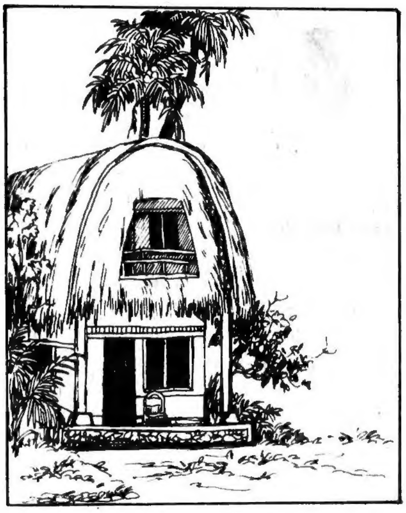
Well, we have taken your subscriptions. If *you* have the time, get the brochure from *AHE,* 159 Cathedral Street, Wolloomooloo, NSW, 2011, and go.

## RAFTING IN NEW ZEALAND

White water rafting is out of my line, but if you are young and fit, what better way to have fun and explore rivers like the Wairoa, Rangitikei, Mohaka, Motu or Ngaruroro in New Zealand? Mark Row and 'Woodworm' specialise in small groups for 1, 2, 3 or 4 days through rapids and gorges. Life-jackets, helmets and paddles are supplied!

Send an international money order for details to **Woodrow Rafting Expeditions,** PO Box 770, Tauranga, New Zealand.

— **Keith**



*Bungalows or* Losmens *are good for families*

## Travelling with children to Indonesia & South-East Asia

Tina Pentes & Adrienne Truelove
Hale & Iremonger, Sydney, 1984, paperback, 224 pages, illustrated. Price $12.95.

Children are a passport to instant friendships in Indonesia and South-East Asia. Tina Pentes and Adrienne Truelove urge you to take the kids with you and give their advice on how to do it cheaply, safely and trouble-free, based on their own experiences with five children, aged from 9 months to 11 years (who loved it).

For seasoned travellers a lot of this is obvious; for a first-time traveller to Indonesia with children, though, it will be invaluable. Very practical hints on planning, preparation (photocopies of birth certificates, $50 in small notes, etc), children's reactions to diet, squat toilets and local children, finding accommodation, hiring a *pembantu* (nanny). Good in imparting the art, culture, language, sights and feelings of Bali, Java and Sumatra. The colour photos are nice, though they obviously add to the price of the book. — *Irene.*

See: *Two and two halves to anywhere,* by Liz Lewis in *Earth Garden 43.*

*Wayang golek*

# Growing bunya nuts

### BUNYA PINE *(Araucaria bidwilli)*

### By David King

The Bunya pine is for farm or larger gardens only. A large, imposing and shapely tree, it takes up to 14 years to bear their tasty nuts (and then does not bear every year).

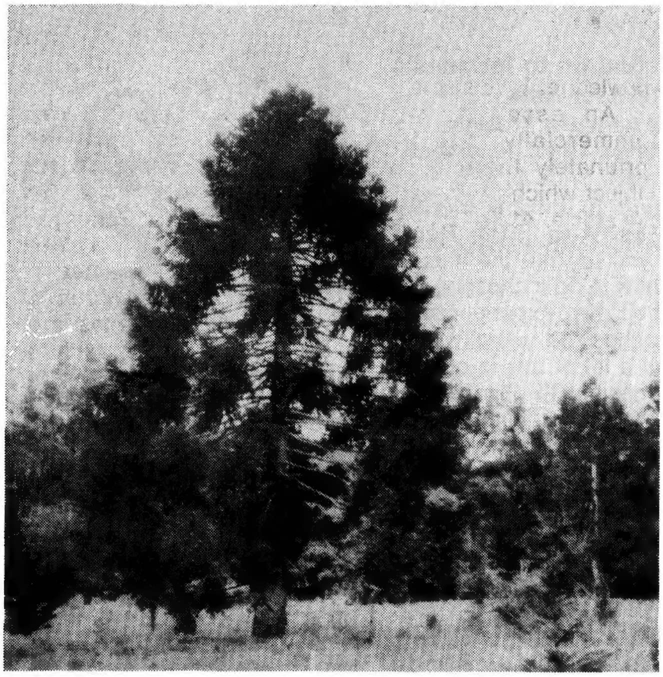
It is one of the least known trees for permanent agriculture, having a very small natural range in two isolated pockets in north-east Australia, though fossil records show it was once more widespread. However, the bunya can be grown anywhere where citrus grows.

Botanically the bunya is a southern hemisphere pine of the *Araucaria* family, originating in the super-continent of Gondawanaland. This family consists of 16 species in South America, the South Pacific and Australia. The name Araucaria comes form the Araucani Indians of Chile who ate the nuts of their local species, the ornamental Monkey Puzzle tree *(A. imbricata),* subsequently introduced into many stately European gardens. The species was described by Sir William Hooker at Kew Gardens in 1843. *Bidwilli* is named for the English botanist, John Bidell, first curator of the Sydney Botanic Gardens.

The bunya's use as a food was well known to Aboriginal hunters and gatherers. At harvest time, tribes would cease hostilities and travel long distances to take part in memorable feasts, the last of which was held in the Bunya Mountains over a century ago. Bunyas have been widely planted as ornamentals, but their use for food has declined.

Bunya pines produce the largest pine cones and nuts in the world. Cones can weight 15-25 lb and the nuts, 2½ inches long, are packed tightly into the cone, the average number of nuts (seeds) being 120 per cone. There is a *mesocarp* (husk) having wings on either side of the area taken up by the *endocarp* (shell of the nut).

A hammer can be used to remove the tough husk from the nuts. It's best to wear gloves and old clothes as there is a sticky latex in the interior of the cone.



**Eating bunya nuts**

My family are amongst a small group of bunya nut enthusiasts. The trees we have planted are not bearing yet but windfalls from other trees are available in parks and along roadsides. The cones drop in one piece. Our favourite way to eat the nuts is to roast them in their shells in the coals of a fire. By heating the nuts in their shells the moisture inside expands and weakens the casing, which makes the task of opening the shell much easier. A temperature of 300° to 400°F is just right; much more than that and the nuts will explode. When you hear a cracking sound it's time to remove the nuts from the heat. Break open the shell to reveal a steaming, opalescent nut meat that has a taste and smell similar to baked potato.

The nuts can also be boiled in their shell for 20 minutes and then opened to be ground for meal and used in many dishes. A friend has roasted the nuts in a cast iron cooker on a gas burner at the local markets as a snack food and created great interest.

Bunya nuts to be stored should be dehusked and dried in the sun for a few hours before putting up. Rats like the nuts, so store them in rat-proof tins or hanging net bags.

**Growing bunya nuts**

Growing bunya nuts is easy as there are no pests or diseases. Germination is slow and takes about one year. The seed should be planted point down in a long narrow pot or plant bag filled with average soil and kept in a sheltered spot. Only water them if the soil becomes dried out as the seed has plentiful reserves. Before the seedlings emerge a second nut grows in the soil an inch below the seed, acting as a further reserve for the seedling.

Young seedlings should preferably be repotted and may be used as indoor plants for a second or third year. The leaves are naturally a glossy deep green and although prickly, they look handsome indoors.

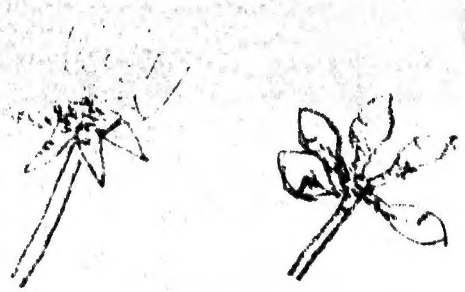
Because the plant is prickly, it may be planted out with no protection next to fences in fields where there are grazing animals. To prepare a planting hole width is less important than depth as the trees have a tap-root. When you've dug down two feet deep, use a crowbar to break up the soil in the bottom of the hole. Refill to the depth of the pot and plant. After the tree is watered in drive in a fork and loosen the ground left undug around the hole.

The trees don't like competition from grass. To supress grass, I've found it effective to lay down several flattened large appliance cartons weighted with stones or clods of earth. These last several years and allow the tree to make a good start without further attention.

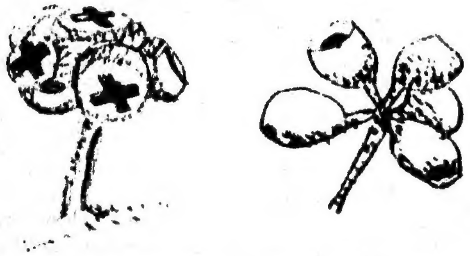
Several trees should be planted as only female trees and bisexuals bear nuts. The female cone is like a large pineapple. If you have more than one male tree, other males may be felled for timber.

The timber is a light softwood, with many knots. In Australia it is used for peeling into plywood and for joinery and boat building. An intersting aspect of the bunya is that a blue-green algae develops on the tree and fixes atmospheric nitrogen.

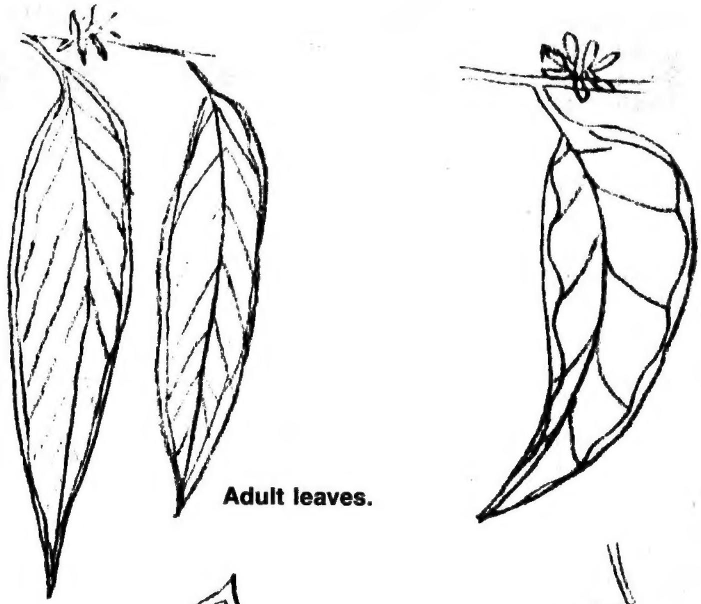
Seeds can be obtained from the **Department of Foresty,** GPO Box 944, Brisbane, Queensland, 4001.



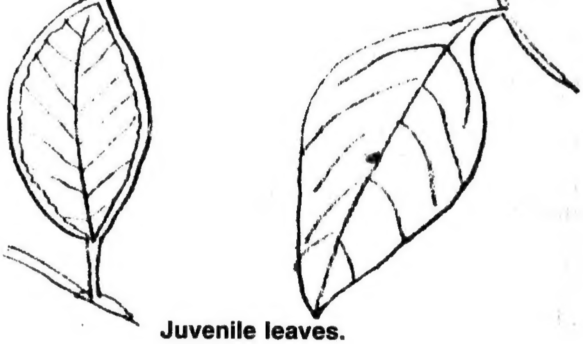
Buds or unopened flowers.



Fruit or gumnuts. These hold the seed.



Adult leaves.



Juvenile leaves.

These diagrams represent buds, fruit and leaves of two stringybarks in our area. These trees are almost indistinguishable from the ground. They are, however, easily distinguishable from differences in buds, fruit and leaves.

# How to collect eucalyptus seed

**By Simon Upward**

More than half the timber people cut is used for firewood. Eucalyptus is the most widely planted hardwood in the world. This stems from two factors. First, they are adapted to extremes of climate. Second, some varieties are among the fastest-growing trees on Earth.

Consequently, eucalyptus seed is in big demand, fetching prices varying from $60 to $500 per kg locally and double that overseas.

Most of the world's eucalypt seed still comes from Australia. Because we have so many varities, which often hybridise, we can supply a variety for most situations. This introduces the concept of *provenance.* Simply put, a variety can alter its characteristics, depending on locality. For example, *Eucalyptus nitens,* found in southern forests, normally sells for around $80 per kg. However, a few small pockets, north of its main range, produce seed valued at $500 per kg.

Unfortunately, a lot of specialised seed collectors shoot down tree branches with a high-powered rifle to collect seed. It can also be collected from logging operations or from fallen branches. There are commercial seed orchards operating abroad, but none, to my knowledge, in Australia.

An essential preliminary to collecting seed commercially is correct identification of the tree. Fortunately there are several excellent works on the subject which are listed in the bibliography at the end of this article. At first, examining tiny gumnuts and coming to terms with botanical jargon may be confusing, but you soon become familiar with new words and Latin names.

To begin with it helps to examine leaves, buds, fruit (or gumnuts) and bark to compare them with photos and illustrations. Look for a difference in small things, such as fruit. We have five or six stringybarks in our area. The leaves have differences apparent only to experts. However, *E. mullerna,* or yellow stringybark, has fruit twice the size of any other and *E. agglomerata,* or blue leaved stringybark, has its fruit in a tight bunch.

When in doubt, look to the whole tree. Study the trees which naturally occur in your area. As eucalypts readily hybridise, it pays to be careful and seed should not be sold until correctly identified. This identification should include the latitude and longitude of the location of the trees, elevation, district or area, the exact number of trees each kg is collected from and any other details the collector thinks might be appropriate.

Seed is generally ready six months after flowering. Local beekeepers can be helpful in identifying flowering times. The seed may be ready while the fruit is green if the membrane covering the valves is brown. Cutting fruit in half with secateurs is also helpful in observing seeds.

Eucalyptus seed is usually very small, often having 70,000 seeds to the kg and with some varieties upwards of 120,000 seeds to the kg. Once the seed has been collected, dried and stored, it can remain viable for up to 20 years. If the seed you collect is not marketed this year, then store it and try again next year.

Many varieties also have what is known as 'chaff' in the fruit with the seed. In many cases this is the same size as the seed and cannot be separated out by sieving, so it is acceptable in with the seed. After working so hard to collect seed it is worthwhile inspecting it closely to make sure there are no bugs in it, as seed is good tucker for many insects. A light dusting with a non-toxic insecticide will solve the problem.

I have found several excellent sources of information on seed in particular and eucalypts in general, one being the CSIRO Division of Forest Research, Banks Street, Yarralumla, ACT, 2600. The Forestry people in your State can also help, if you find the right person. Seek out the old bloke with plenty of experience out in the bush, rather than the city-educated young bloke.

In NSW, Forestry is at present interested in a multiple use approach to State Forests and seed collectors are welcome if they don't get in the way. A *Products Licence,* priced around $20 for three months and royalties of $5.00 per kg of seed you expect to collect, are prerequisites to collecting in State Forests. The Forestry Commission collects a large amount of seed for its own purposes. There are also some private collectors, well set up with four-wheel drive vehicles, who travel hundreds of kilometres to collect seed.

My advice if you get on to something good, is to play your cards close to your chest. If you have overseas contacts, say in South America or the Middle East, use them, as prices there are twice that offered by Australian wholesalers.

**Collecting**

By now you are probably thinking, "When is he going to tell us how to collect the stuff?" My intention is to impress on you the importance of correct identification before you collect any seed. This is essetial, as incorrect identification of seed will ruin a seed collector's reputation.

Basically, seed is collected by subjecting the unopened fruit to heat, usually the sun. As the fruit opens the seed drops out and is collected. There are two ways I know of collecting seed in the forest:

☐ Collect the branches and snip off all leaves, then lay the branches on sheets of black plastic. They may also be laid out on a tarpaulin. However, black plastic tends to accelerate the process as it absorbs heat so readily. This is only really efficient in summer when the process can be completed in one or two days. Once the fruit has opened the seed drops and is shaken out. The seed is then scooped up and dried out under cover for a few days before storing.

☐ For smaller amounts of seed, or in cooler weather, a chicken wire 'hammock' is used. Cover it with a tarpaulin. Place the branches on the wire and hang another tarpaulin below the hammock. Cut a hole in the bottom tarp and hang a billy beneath it. As the fruit opens, the seed drops out, rolls down the tarp and into the billy.

The Forestry Commission also uses large fixed structures. These are basically larger versions of the second method described and the idea could be adapted by those who live in the forest.

There is only one book on eucalyptus seed that I know of, published by the CSIRO and titled *Eucalyptus Seed.* It is fairly technical but not unreadable and contains a lot of valuable information for the serious collector.

**Propagation**

I feel I should finish this article with a short note on propagation of eucalypts from seed.

The first step is to germinate the seed in a greenhouse, otherwise any warm place inside the house will do. This is usually done in spring.

A shallow seed tray is used. Fill with 50-50 peat moss and river sand. As the seeds are so small it is advisable to mix them with sand before sprinkling onto the germinating mix. This saves sowing them too thickly. Then cover them with a layer of peat moss twice the diameter of the seeds.

As overhead watering can disturb the seeds, it is a good policy to place the seed tray in a shallow container of water until the surface of the peat is moist. Then remove the tray, drain and place in the germinating conditions. To ensure that the seeds do not dry out before germination occurs, sheets of black plastic or paper can be used to cover the trays. Once the seeds have germinated they need maximum light to develop into good plants.

Once they are big enough to handle, the seedlings can be transplanted into small pots or tubs. Leave them in the greenhouse for a month or so before placing them in the shadehouse for the summer. Water regularly. Trees can be planted out the following winter. If you want to keep them longer they should be put into 10-15 cm polythene bags or pots. Either way they should be half to one metre high 18 months after germination.

A list of seed wholesalers can be obtained from the CSIRO Division of Forest Research. The wholesalers are generally interested in lots from 500g to 25 kg. They also purchase seeds of acacias, native shrubs and native flowers. A letter to wholesalers is a good way of finding what, from your area, is sought after.

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Costermans, Leon, *Native Trees and Shrubs of South Eastern Australia,* Rigby, Melbourne, 1983.

Hall, Norman, *Forest Trees of Australia,* Australian Government Publishers, Canberra, 1970.

Toogood, Alan, *Propagation,* J. M. Dent and Sons Ltd, Melbourne, 1982.

## PERMACROFT COOPERATIVE

Permacroft Cooperative is the name now given to the group mentioned in *A proposed community,* by Daryl Sipos in *Earth Garden 40.* It combines the concept of permaculture with the word *croft,* formerly given to farming villages in Scotland and other places.

The community will include a co-operative farm and business, aiming at self-sufficiency in agriculture to be established in a Victorian country town. Members may live in houses in the town, or build on the farm.

For a detailed prospectus of *The Permacroft Proposal,* send $2.00 to Daryl Sipos, Permacroft Cooperative Ltd, 366 Smith Street, Collingwood, Victoria, 3066. Phone: (03) 419 8700.

## CARDAMOM *(Elettaria cardamomum)*

### By Roger & Renuka Oakden

Cardamom is a vital ingredient of curry and is also used in other tasty Asian dishes. While holidaying in the Nilgris Hills ranges of southern India, we were interested in the methods of growing this 'Queen of Spices' which should suit the climate in the wet hills areas of northern New South Wales and Queensland.

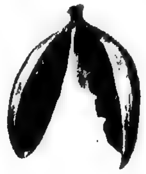
Cardamom is a perennial herbaceous plant reaching a mature height of between 2-4 metres. In India, flowering is from April until August, with fruits maturing three-to-four months after flowering. Each fruit or capsule contains 15-20 seeds.

On maturity the fruit turns pale green. A healthy plant will produce about 2,000 pods or capsules with a green weight of 900g of dry capsules.

The market price at present is $100 per kg, although it has been as low as $40 per kg. To our knowledge, all cardamom in Australia is imported.

In India the plant grows in the evergreen forests at altitudes from 600-1500 metres with a well-distributed rainfall over 150 cm and a temperature range of 10°-35°C. It is sensitive to wind and drought, while waterlogging or excessive moisture are equally injurious.

The ideal site for cardamom is sloping land with a good drainage in rich forest loam with plenty of leaf mould, with a rate of 5-8 tonnes per hectare of leaf fall.



From an *Earth Garden* viewpoint, cardamom is the least destructive crop to native forest, as it is a shade-loving plant. Following successful trials in India growing the crop within blue gum and mountain ash plantations, it could be suitable in NSW and Queensland on hilly, sloping land, which is cheaper usually than normal farming properties.

The commonly cultivated cardamom varieties are Malabar, Mysore and Ceylon, the first two being widely grown in southern India, which supplies 70 per cent of the world's production.

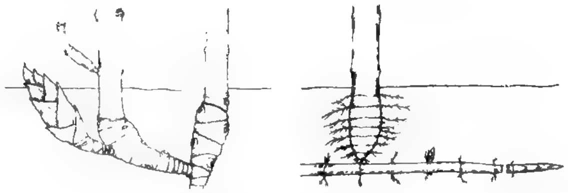
To plant cardamom, place staked seedlings 5-8 cm deep in pits of 60 cm × 60 cm × 35 cm filled with surface soil and compost and at spacings of 2m × 1m or 2m × 2m. Planting time in India is June-July or September-October.

Weeding is done four times in the first year, three in the second and twice a year after that. Other jobs consist of manuring each plant with cattle manure or leaf compost, filling in gaps and lopping shade trees.

Cardamom comes into bearing in its third year and commercial crops are available after the fourth year, with harvesting in October-November when capsules are picked just short of full ripeness. The average yield of dry capsules from a well-maintained area is 100-150 kg per hectare.

Preparation of cardamom for sale consists of drying and sorting. Drying in a drying house heated by flue pipes for 48 hours is preferred, as it retains the green colour of the capsules. The dried capsules are rubbed to remove plant residues and foreign matter and sorted by size and colour, with green having the highest value.

As you can imagine, growing cardamom is not arduous and has good potential returns. We think the growing number of people settling in Australia from countries where cardamom is used make it worth considering as a cash crop.



## PROPAGATING BAMBOO

### By J. M. Wertz

The most reliable means of propagating most species of bamboo has been by root division of rhizome material between one and three years of age. Anyone who has attempted to take such a cutting from a mature specimen of a large growing species will appreciate how difficult this is, due to the considerable bulk of the propagation material, space required for establishment and expense of transport in exchanging plants.

Consequently, over the past few years I have received many inquiries about the possibility of propagating bamboo from cuttings. I have experienced a high degree of success with several *sympoidal* species using this technique:

☐ Select a semi-mature culm or primary branch 2-4 centimetres in diameter that has its 'wood' well enough developed to present a reasonable degree of resistance when cut with a pair of sharp secateurs (one can quickly note the difference by cutting younger culms or branches).

The apex of the culm or branch should be still showing signs of active growth (uncoiled leaves, etc).

☐ Using your secateurs, cut the desired culm or branch at its base, then count four nodes from the base and remove the top portion above the fourth node.

☐ Trim away secondary branches from the bottom three nodes (if present) and reduce excessive secondary branch development from the fourth node at the top of the cutting.

☐ Plant the prepared cutting in an upright position in a moist well-drained potting media, being sure that the bottom two nodes are covered and place in a warm semi-shaded moist situation.

☐ It may take almost a year before you observe the development of the first new culm. Once the new culm has finished growing it is usually possible to remove the rooted cutting and divide them into two viable plants.

Don't be discouraged if the cutting appears to have died, as it is not uncommon to have a new culm spring up months later from what appeared to be a dead cutting.

Some species of bamboo are reputed to be more difficult to propagate in this fashion than others and, indeed, some species might prove impossible.

Our immediate environment here at *Mirkwood* (hot, wet, tropical lowland rainforest) might give a higher degree of success than in more temperate localities. It is my impression that the age and stage of development of the selected cutting is most important. Also take care that the potting mix is *never* allowed to dry out.

We would like to contact anyone interested in exchanging propagation material of different species and varieties of bamboo.

**J. M. Wertz, Mirkwood, PO Box 237, Mossman, Qld, 4873.**

# Tree crops miscellany

### Proceedings of the SECOND NATIONAL BERRYFRUIT SEMINAR

Edited by N. R. Jones, The Rural Australia Foundation, 1983, large format paperback, typescript, 129 pages. Price $6.00 per copy including postage from PO Box 883, Orange, NSW, 2800.

Papers from the Seminar held at Orange Agricultural College in May, 1983, cover strawberries, raspberries, gooseberries and currants, with much information on blueberries. There is an accent on marketing the berry crops, with discussion of wholesale, retail, market, roadside stalls and 'pick your own' — "overseas studies have indicated that around 750g of strawberries are eaten for every sale."

### PERMACULTURE COURSES

Permaculture design course. June 13-27, 1985. Mapleton, via Nambour, Qld, at Mapleton Conference Centre.

The course will involve all aspects of permaculture design and principles in urban/rural/village situations in theory and practice.

For further information write to Kim Christie/Max Lindegger, M.S. 956, Mapleton Falls Farm, Mapleton, Qld, 4560.

Design course for women. September 15-28, 1985. Tweed Valley, north-eastern NSW, Instructor: Lea Harrison. Cost $280.00.

Child-care will be provided for a limited number of people.

Contact Lea Harrison, Stoddarts Road, Tyalgum, NSW, 2484.

### RARE FRUIT COUNCIL OF AUSTRALIA

The Rare Fruit Council of Australia, founded in Cairns, north Queensland, in 1979, now has branches throughout Australia, including Western Australia and Northern Territory. These include Darwin, Mossman, Atherton Tablelands, Ingham, Townsville, Mackay, Gympie, Brisbane, Kununurra, Cardwell/Johnstone and the Rockhampton/Yeppoon/Capricornia zone.

The Council aims to promote the introduction and culture of rare and exotic fruits and vegetables from all over the world, on both a domestic and commercial scale. Regular meetings are held at all the branches.

Annual subscription of $20 per annum, per family ($A25 per family overseas), includes the *Newsletter*, edited by Jacky Marshall, issued six times a year. Address: PO Box 707, Cairns, Qld, 4870.

### BABACO *(Carica pentagonia)*

In Ecuador, South America, they say the juicy golden yellow fruit of the babaco tastes like a blend between pineapple and pawpaw, with a hint of strawberry. The Indians call it 'the fruit of the gods'.

The babaco grows in the remote valleys high up in the Andes at altitudes of 2,000 to 3,000 metres. It is a hybrid between the mountain pawpaw *(C. pubescens)* and the Chamburo *(C. stipulata)* and resembles the tropical pawpaw *(C. papaya)* of which it is a relative.

But babaco is more cold tolerant than pawpaw and was recently introduced into New Zealand, where pawpaws cannot grow, where it is mainly raised in greenhouses and plastic covered shadehouses to ensure a humidity of 75-80 per cent.

They are best suited to a mild to subtropical climate which is frost-free as in the Ecuadorian Andes, which has an annual temperature range of 5° to 20°C. A constant supply of water is needed in summer. They should be protected from winds and suffer from sunburn in temperatures over 25°C unless protected.

Like the prolific pawpaw, babaco plants grow quickly, fruiting at around 10-14 months after planting and bearing heavy, elongated fruit on a small tree, only 2-2.5 metres high at maturity. The fruit are produced on long stalks from the thick, fleshy trunk. The yield per tree (over a season of several months) is 30-70 fruit each about 30 cm long and 10 cm in diameter and weighing 1-2 kg. Fruits reach full size, then take 6-8 weeks to ripen and are picked when they are 30 per cent yellow (they are dark green when unripe). Plants are reckoned to have a commercial life of about 8 years.

In Ecuador, babaco is often cultivated on smallholdings where there are free-ranging chickens. A chicken litter mulch of 5-10 kg per year is considered an ideal fertiliser and the plants like soil with a high content of organic matter.

Babaco juice is a popular drink and the fruit may be eaten raw, sliced, with ice cream or in fruit salad, baked with fish, or barbecued with meat. It is not as sweet as the pawpaw and has a low natural sugar content, though it is high in vitamin C.

Babaco plants do not have seeds and do not need pollination and they produce only female flowers. The plants cannon self-reproduce and are usually propagated by tissue culture.

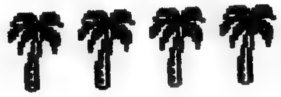
Further information on babaco is available from Mr Les Chivers, who introduced the fruit into Australia from New Zealand and has plants for sale at **Babaco Marketing**, PO Box 187, Dural, NSW. 2158.

## VICTORIAN NUT GROWERS' ASSOCIATION

The Victorian Nut Growers' Association was founded in 1979 to promote interest in nut-bearing plants, promote scientific research into the breeding and culture of nut-bearing plants, to promote the standardisation of cultivar names, encourage dissemination of information of nut-bearing plants and to support other organisations with similar objectives.

The Association publishes *The Victorian Nutgrower,* a 30-page quarterly magazine, and holds meetings and field trips throughout the year. The annual general meeting, usually held in July, alternately at a city or country location, includes seminars and workshops over two days. The next farm walk will be held on the weekend of March 9 and 10, 1985.

There are currently over 300 members throughout Australia and New Zealand. Membership is $20 per annum, plus a joining fee of $10.00, from the Secretary, Victorian Nut Growers' Association, PO Box 69, Wangaratta, Victoria, 3677.



## SUBTROPICAL FRUITS

### — A compendium of needs and uses

Max O. Lindegger, Permaculture Consultancy, 56 Isabella Avenue, Nambour, Qld, 4560, large wall chart. Price $7.50, plus $2.50 posted in cardboard tube.

The sub-title of this chart is: "A design aid for permanent agriculture in town and country". It gives detailed growing information on nearly 100 fruit trees, common and rare. Botanist David Bellamy makes this comment:

"The greatest natural resources of the Earth are its plants and the ability of people to use them wisely. They are the productive base of all our pasts and all our futures. Max Lindegger's **subtropical fruits** . . . puts the full potential of 98 plants at the disposal of all people lucky enough to live in a subtropical environment. Join him and prove that conservation begins at home."

## PECANS & HAZELNUTS

Dear People — I would really appreciate some information on pecan nut and hazelnut trees and growing them. For instance, I believe the pecan tree is large, but how large? How many years before it attains full growth and is it possible to prune back?

I believe the hazelnut is smaller, but again I haven't been able to find out the approximate height or spread (in yards, inches or metric).

**Can you help me? V. Gurney, Drouin, Victoria.**

Pecans (*(Carya)* species) are a kind of hickory and relatives of walnuts. They grow to 10-17 metres high with a 13m spread and even more root area, as they put down long taproots and are suckered for propagation. They are pruned at 3 metres or about 10 years old.

They require a long period of warm weather and do well in climates such as Turkey, California, Israel, South Africa and Western Australia. A leaflet, *Farmnote 99/79* is available from WA Dept of Agriculture, Jarrah Road, South Perth, WA, 6151. There is a fairly good article on pecans in *Tree Crops: the 3rd component* reviewed here.

Hazelnuts and filberts *(Corycus* species) probably grow as large, the Turkish variety reach 20 metres in height, with roots to 4 metres (suckers again). The Chinese types grow to 35 metres in height! Not much information is available, as you say, but again these nut trees need a long warm period during the growing season. There are many varieties of both types of nut available in Australia, but stock is expensive. Does anyone have some firmer information.

## FACT SHEETS

The wide range of Fact Sheets, each 2-3 pages, put out by the Department of Agriculture, South Australia, includes many which deal with tree crops as well as pastures, vegetables and animals.

For example:

Almonds for the garden — Fact sheet 135/77

almonds — guide to relative flowering periods — FS 149/76.

The re-working of almond trees — FS 80/76.

Pollination for almonds — FS 34/77.

Growing pistachio nuts — FS 16/78.

Raising pistachio seedlings — FS 14/83.

T-budding, whip and tongue grafting of pistachio seedlings — FS 15/83.

Chip budding pistachio seedlings — FS 16/83.

Growing kiwifruit at home — FS 38/81.

Growing macadamia nuts — FS 26/81.

- Fact sheets are available from Department of Agriculture, SA, GPO Box 1671, Adelaide, SA, 5001. Ask for a Publications List.

## TREE CROPS

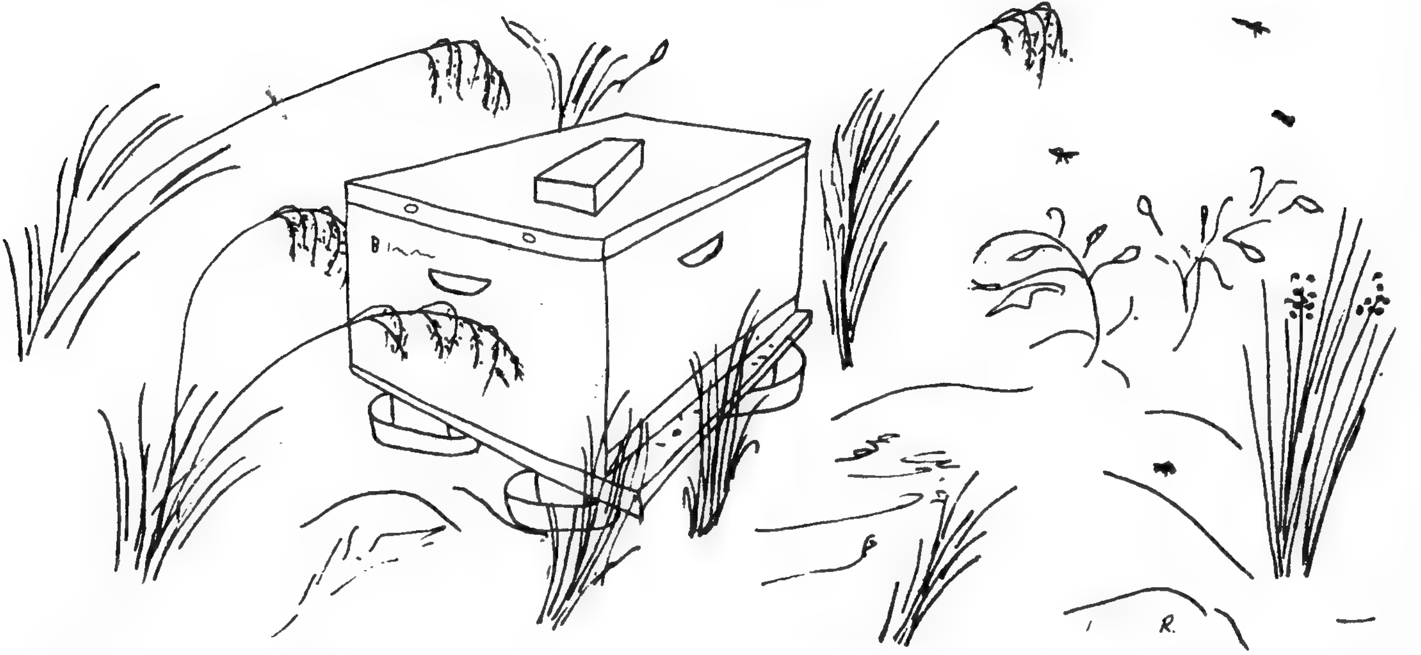
### The 3rd component

Edited by David Noel, Cornucopia Press, 1982, large format paperback, typescript, 232 pages, illustrated. Price $22.00. Our copy from Second Back Row Press, PO Box 43, Leura, NSW, 2781.

All the books on nut trees have been stolen from the State Library of NSW, a librarian told me, so something is happening. This record of proceedings at the First Australian Conference on Tree and Nut Crops in Perth in 1982 may fill the gap.

Information is varied, with something for all climates. Very good on propagation. Includes papers on forage trees, tree lucerne, honey locust, walnuts, macadamias, jojoba (Milan Mirkovic's 'one-hit' crop establishment method), berries, guava, hazelnuts, feijoas, cherimoyas, pistachios and pecans.

# Siting the hives



**By Greg Baker**

Siting beehives didn't strike us as much of a problem until we bought some of our own.

Fearing headlines screaming: "Escaped Bees Cause Massive Accident on Highway", we strapped them firmly into the rear seat belts of the car and drove gently to our block in the bush. Once there we looked around for a likely spot to put them. There was a bared area on a south-facing slope where we'd had building material stacked, so we put them there.

To keep out marauding ants we put half a brick in a cut-down orange juice container under each hive corner and filled the containers with old sump oil. They looked a bit precarious leaning there, but the wind usually blows up that slope, so we figured they would be alright.

As the months went by the grass began to recover from the building materials and grew up around the hives. On the odd occasions that fine weather co-incided with a weekend at the block we checked inside the boxes. The bees didn't seem to be producing much honey, so we decided to keep a really close eye on them during our next long break there from city jobs.

We found that even on the warmest day there wasn't much activity until around midday. Then the bees would come out in dribs and drabs, rubbing their eyes, yawning and scratching. They'd put in about two hours field work until the boxes were again in deep shade and they decided it was too cold to stay outside.

We tried to keep the grass down, but we weren't there often enough to make a big impression on it. The lack of honey led to a lack of interest on our part, so in the end the grass just grew on unhindered. The bees didn't seem to come out much at all after that. There were times when we wondered if they were there at all.

For a while we were tied up on our building projects and with moving to the land to live there. The day came, however, when my friend informed me that it was time I "Did Something About Those Bees".

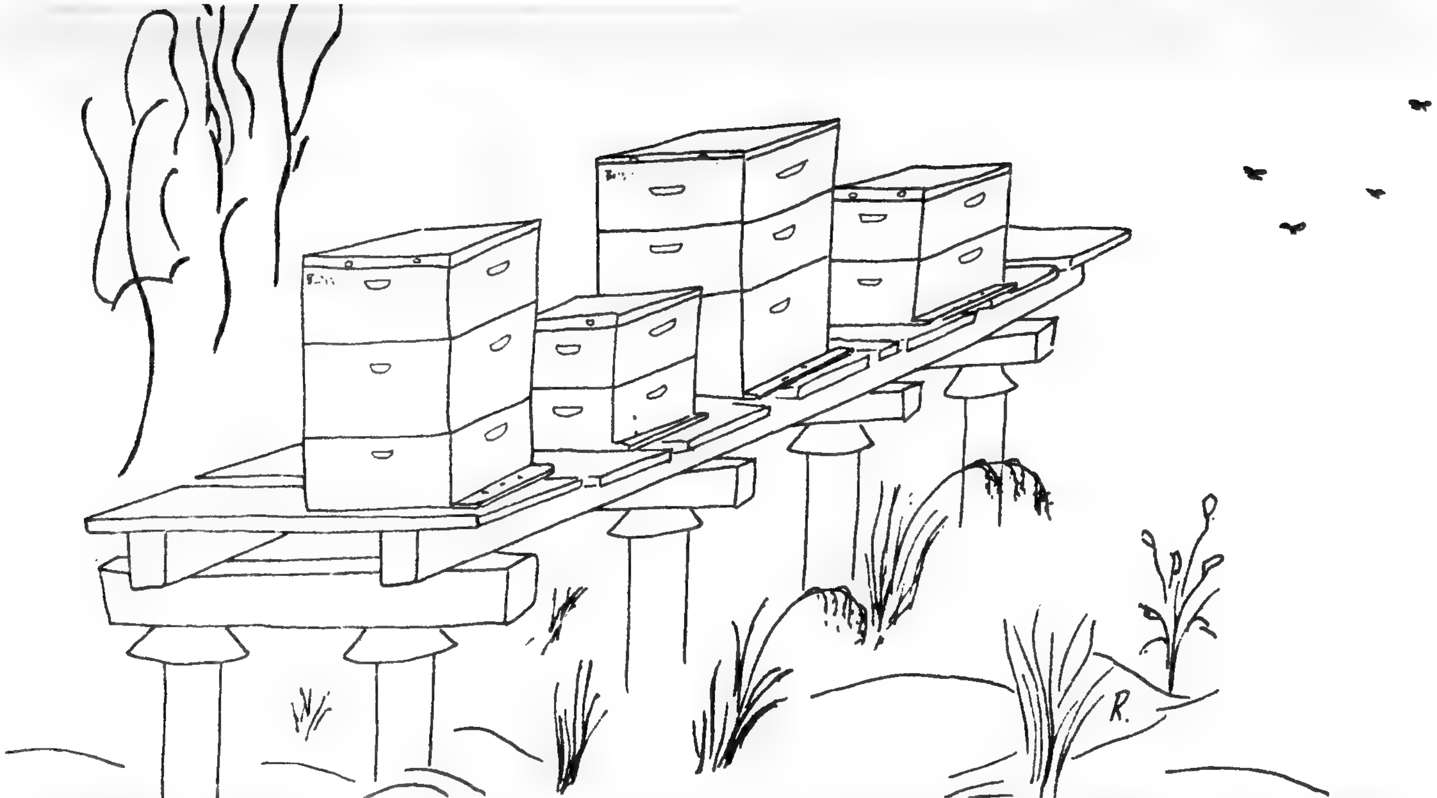
I slashed a path through to the hives to find that the bees had gone or died, or whatever it is that bees do when they're no longer in evidence. That is the ones that weren't part of the solid mass of bees and sump oil in the juice containers. Termites had got into the boxes too, which were now paint holding sawdust in place. And what comb was left after the ants and moths had been at it had cells formed at about 60° to the foundation, presumably to keep the cells horizontal and stop honey running out before they capped it.

So we decided to start again and do it properly this time, tackling the siting problems one step at a time. We crumbled the old boxes into the compost, bought some more hives and a bushel or so of bees. This time we put them on a gentle north-easterly slope so they'd wake with the sun in their eyes, get on with the work a bit earlier and stay at it longer because of the warmer aspect.

We also jammed a few bricks under one end of the hives to make them level. We figured this would make them build cells at right angles to the foundation, thereby making any honey easier to extract.

So far, so good. That only left vegetation to worry about. We wanted to be able to find the hives and for the bees to be able to find the hives as well. I'd once seen a mad uncle use a flame thrower in this situation, so I rather fancied that idea and planned a trip to the army disposals sotre. As a further refinement, I thought a few smoke bombs for robbing the hives would also be in order. One of us, who shall remain nameless, wouldn't be in it. The world is full of dull, unimaginative people, so a flame thrower was out.

The next idea was to use a lawn mower. We found someone silly enough to lend us their U-Beaut four-stroke, you know, the one advertised showing a smiling toddler



mowing 12 hectares of sugar cane before pre-school. I struggled to get it going for about 10 minutes, working myself into a lather of sweat and nearly tearing out my right arm on the rope starter before my friend emerged from inside and showed me where to turn on the petrol.

I ploughed in towards the hives and made two interesting discoveries before I had finished a single cut 5 metres long behind the hives. The first was that the granite hidden in the long grass wasn't like the toddler's sugar cane. The other was that shorts and tee-shirt wasn't the best outfit for mowing near beehives. By the time I made it to the creek, dragging the mower behind me (for some reason which escapes me now), the bees were three deep all over me.

The creek solved the immediate problem. Bees don't swim too well, but then, neither do motor mowers. By the time the lumps had gone down, I'd gotten the water out of the mower and replaced the blades and the cracked frame, I'd decided to sacrifice our newly-acquired sheep. Let them eat down the grass. Let them get stung. It worked well too, until the ram decided to rearrange his itch-mites on the tallest hive and pushed it over. Oh, that was a great day. We had to hide inside until after dark when the commotion had died down. Then we sneaked out with the full gear to put it back together.

Even after that we still fancied the sheep could do the dirty work, so we decided to put the hives up on a platform, half a metre off the ground and facing roughly north. It looked like a jetty stranded by a moving shoreline. The sheep could eat the grass around and under the platform and not get at the hives. The ram didn't go too close anymore.

So finally the three essentials were taken care of: sunny aspect, level hives and no vegetation near the entrances. A platform can be built practically anywhere, which gives a great flexibility of location. It is also good to have a clear, level space to stand on and work from when robbing or inspecting the hives.

Our structure is 5.5 metres by 1.4 metres and has five hives, leaving .7m between each and .8m behind them. This allows room to stand and also to stack frames removed from the hives and to put in replacement frames and foundation, or 'stickies'. As our platform just borders on the side of too small, the dimensions are probably minimum ones. Ant caps can be used too, to discourage all but the most persistent ants and termites.

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## HONEYBEE

### By Steven Guth

**The Jacaranda Press, 1976, hardback, 48 pages, illustrated by Susan Wackwitz.**

This little book has been around for a while, but we first saw it a year ago. It introduces bees and beekeeping for honey to children of all ages.

A large text with simple wording for the littlies is at the top of each page and a smaller, more detailed text for better readers is at the bottom of each page opposite the lovely colour and black-and-white illustrations.

There is a glossary of terms at the end of the book, which is a companion to Steven Guth's *Mozzie Mosquito*.

# Back into beekeeping

**By Ross Riddett**

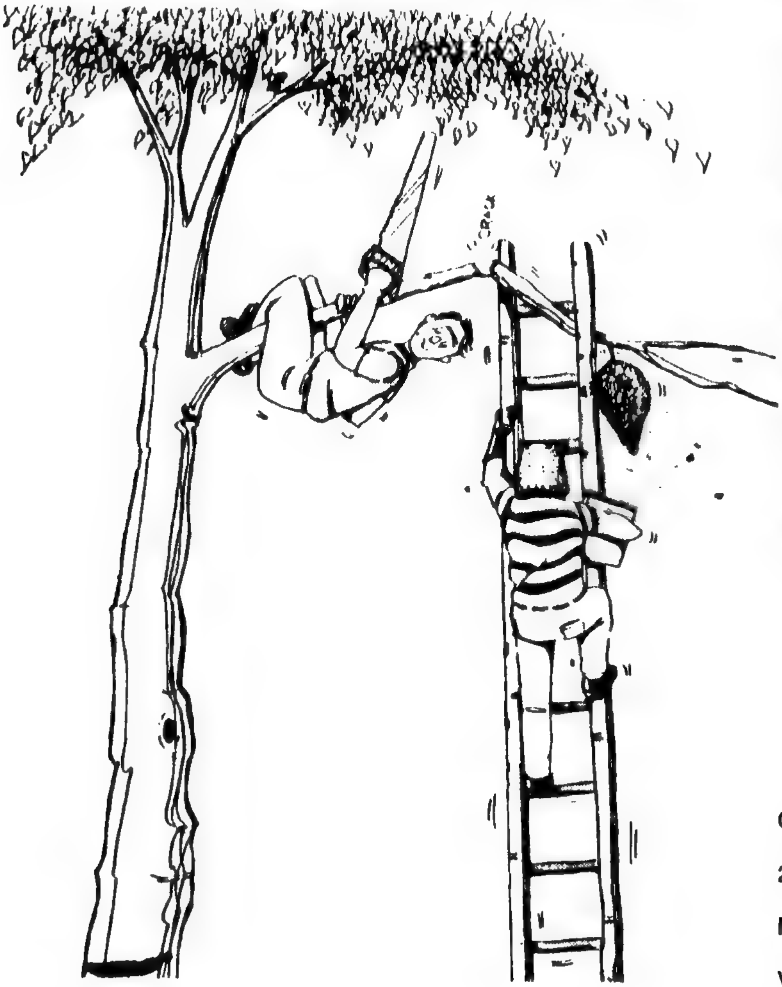
Spring 1984 was a bumper season for bee swarms in Canberra. It was about September that I decided to get back into bees after having lost most of my hives in the last two years of drought.

I placed my name on the *Department of Territories and Local Government Swarm List*, a service provided in Canberra, where the body equivalent to your local council takes the name of amateur beekeepers who wish to obtain swarms of bees. When people ring up the police seeking removal of swarms their details are passed on to the next amateur beekeeper on the list.

In the past few years there have tended to be more amateur beekeepers than swarms. This year the opposite has occurred. At one stage I was getting three or four calls per day. I would get strange calls like:

"This is the Police Operations Branch, Constable McGoo speaking. We have a call from Mrs Smith saying that she has a swarm of bees in her laundry. Would you like to remove them please?"

On arrival at Mrs Smith's house I was confronted by a very nervous lady who was wondering what she had done to deserve X thousand bees taking up residence on the side of a wall cupboard in her laundry. My first task was to calm her down and reassure her that swarming bees are relatively docile and that I would soon have them in a box. Donning my veil and gloves (I still respect the little darlings' ability to sting and hurt if upset), with one sweep of the hand I deposited the bees into their new home. No stings, no fuss.



Mrs Smith was almost beside herself with thanks and asks how much I charge. "Nothing," say I, "the bees are my payment". Another satisfied customer saved from having to call 'Killapest' and pay a $50 bill.

It sounds too easy, doesn't it? I must admit that they are not all as easy as that. Another call finds me trying to coax the bees into a box held precariously by another beekeeper on his head 5 metres up a gum tree. After sawing halfay through the branch on which the bees have gathered the branch snaps and half the bees fall into the box while the other half fall all over the poor soul holding the box.

But still, no stings. Aren't we clever? So we thought, until on returning the next day I find all the bees are back up the tree again. Obviously we did not catch the Queen and the swarm has returned to where she landed. Oh well, you can't win them all! The owner of the house was still satisfied because the swarm in the end decided to seek out a destination unknown and left the tree that afternoon.

There are many other stories like these, including the lady who wasn't happy with me saying I would be over after work to pick up the swarm near her back fence. She rang the local Member of Parliament to get some quicker action and was referred full circle back to me via the swarm list. Just goes to prove that politicians can't do anything we can't do ourselves.

As you can see from just a few personal case histories, if you want to go a-swarm-catching you will need to live by the Scout's motto: 'Be prepared'.

The following equipment and personal attributes are essential:

*Equipment:* Beekeeper's veil, gloves, brush, bee box, ladder, saw and secateurs.

*Attributes:* Desire to keep bees, foolhardiness, perseverance, acceptance of failure, reassuring manner and, most of all, a warped sense of humour.

Ross Riddett wrote on the details of *Hiving a swarm* in our 'backyard bees' section in *Earth Garden 35* in August 1982.

## BEEKEEPING EQUIPMENT

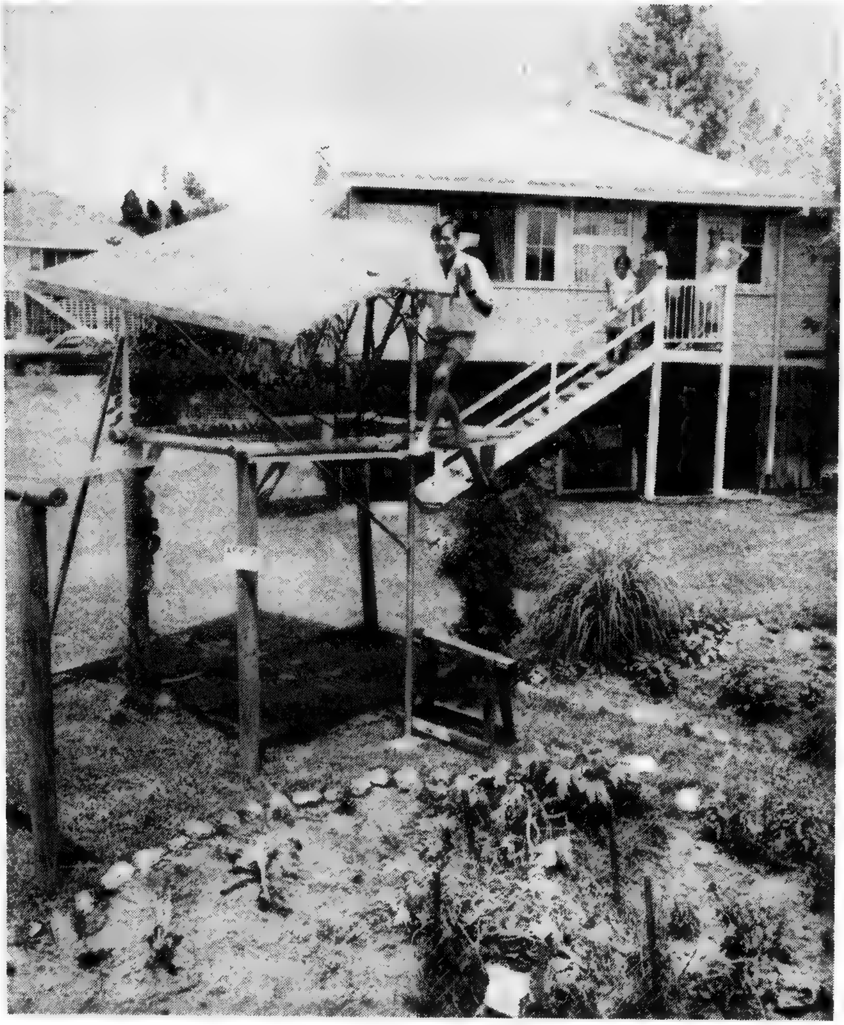
Write for catalogues or price lists:

*John L. Guilfoyle (Sales),* 772 Boundary Road, Darra, Qld, 4076.

*Pender Beekeeping Supplies,* PMB 19, Maitland, NSW, 2320.

*Redpath's Beeline Apiaries,* 21 Capella Crescent, Moorabbin, Victoria, 3140.

*Going Solar,* 320 Victoria Street, North Melbourne, Victoria, 3051.



**Adrian Hogg atop the timber-framed solar cell array which provides all the electricity for his Brisbane home. The array is now fitted with a solar tracker.**

# NO MAINS HOUSE

**A traditional Brisbane timber house has switched off the mains electricity and now depends entirely on the sun for its energy requirements.**

## THE SOLAR POWERHOUSE

### By Adrian & Jutta Hogg

During the summer of 1977 we purchased an old butcher's shop at Toowong, 3 kilometres from the Brisbane GPO. After some changes we opened our doors for business, selling potted herbs, natural pesticides, grinders, solar modules, wind generators, solid fuel stoves, inverters, batteries, books and many other renewable energy products and services.

We called the shop Alterna*tives* (see alternative energy access survey in **Earth Garden 38**). However, we soon realised that people wanted to see a living demonstration in self-sufficiency, not just a static display of products.

We decided to show people how successful a solar independent house and garden can be and, with luck, we were able to buy an old traditional Queensland house, next door to the shop.

During November 1984, we arranged for the mains power supply to be cut off.

Our power comes from three main areas:

1. 12 **Tideland** solar modules GG2541/12 mounted on a wooden frame in our garden and charging eight **Besco** 230 amp batteries at 24 volts (V). We also have a 240V/1,000 watt (W) **Santech** inverter. The system runs a 24V fridge, 11 × 24V lights, sewing machine, steam iron, **Sanyo** automatic 360W washing machine, stereo and TV.

2. **Suntrac** solar hot water system and a **Stanley** slow combustion stove to provide our hot water and cooking needs.

3. The garden is designed along permaculture and edible landscape concepts. Although it is only an average inner suburban block it supplies us with organic vegetables, tropical fruits and herbs. We also have some native trees for the birds (and later for the stove).

The objective is to demonstrate the viability of solar enegy within an urban environment and the energy saving advantages of organic gardening methods for city people. The house is open by arrangement to school groups and interested people.

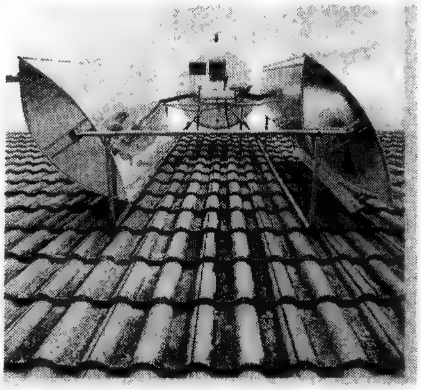
We feel that it is important for people looking for alternative energy systems to be able to see for themselves a house dependent on renewable energy before they buy their system.

We would be pleased to show people our house, which is open from 1pm to 9pm on Saturdays only. Contact us at alterna*tives*, 37 Bangalla Street, Toowong, Qld, 4066. Phone: (07) 371 6994.

### Suntrac solar water heater

Information from Alterna*tives*, Brisbane.

Invented by the Little Brothers, in Mt Isa, Queensland, and made in Australia, Suntrac differs from other solar water heaters because its two concentrating parabolic collectors follow the sun all day. Photo shows the position of the concentrators in late afternoon.



# WATER WORKS

An adequate and reliable water supply is a necessity for the new settler or farmer. You can carry water from the creek or the dam by bucket for a while, but it is heavy stuff and there are more ingenious ways to move it. We need good quality water to drink, to wash ourselves, to clean cooking implements, dishes and clothing and for waste disposal. This is essential for our health.

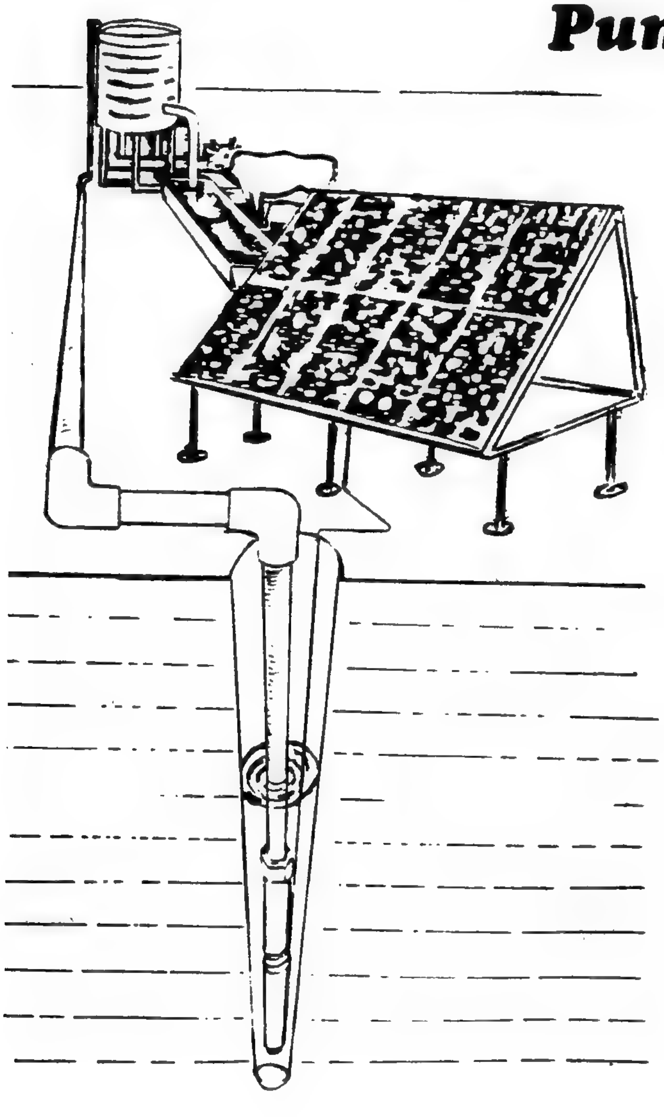
We also need to water the food plants in our gardens and orchards, to feed domestic animals and in most cases as an emergency reserve for fighting bushfires.

Renewable forms of energy come into their own in shifting water from the source to these end-uses. Sun, wind and water are on-site on your land and may be harnessed at low cost.

The following stories deal with solar electric water pumping, a windpump with a reciprocating wire pulley system (adapted from a method used by the Amish in Pennsylvania), and ways of shifting and lifting water using the flow of water itself and natural gravity.

We have had many stories on water supply systems over the years in **Earth Garden** (notably EG11 and EG22-3) but there are still some loose ends to tie up. Has anyone dug a well or drilled a borehole to use underground water? Can anyone report on their experiences with solar electric pumps? If so, we'd like to hear from you to fill in these gaps in our knowledge.

## *Pumping by sunlight*



The sun can pump your water supply from rivers, creeks or dams and from shallow or deep wells or boreholes at a good rate of flow in areas far from the electric grid supply.

Photovoltaic or solar electric powered pumps can deliver from a few hundred to several thousand litres of water per day from the top of a dam or from a bore 4 to 150 metres or more in depth.

In a typical shallow pumping system an array of about four solar cell modules are hooked up to power a 12V or 24V direct current (DC) pump.

If no batteries are used, the pump will be 'sun synchronous', that is, it will work only when the sun shines, which is fine for watering livestock and irrigating crops. With fixed solar modules this may be for just a few hours a day, peaking at noon, with little output in the early morning or evening and none at all at night.

A tracking system which will keep the solar arrays aimed at the sun will boost the efficiency of the solar cells by about 30 per cent; in other words the area of solar modules used may be cut down by one-third if a tracker is used. However, we still don't know of any solar tracking system available in Australia.

If you want a domestic supply with water constantly on tap you have three choices:

☐ Add battery storage, so that the pump will be able to work constantly 24 hours a day.

☐ Pump water to an elevated tank to provide pressure by gravity flow for the household.

☐ Use a small booster pump (it may be solar electric) to direct water from a large ground-level or in-ground tank.

On current prices it would probably be better to go for the overhead tank, even taking the extra cost of the water storage into account. However, a battery bank will ensure that pumps work well as most types operate better with lower pumping rates and constant output. Larger pumps are said to be more efficient also. Of course, electric pumps can be powered from existing solar electric systems by adding more solar modules (and batteries if required).

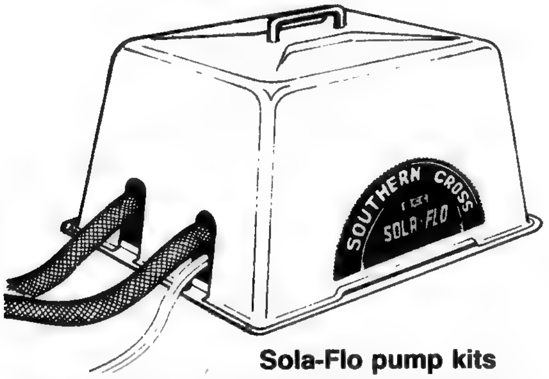
Solar electric pumping systems make sense in arid places where there is plenty of sunlight and little water. They pump more water in summer when it is needed more (and if the pumps stop during cloudy weather, perhaps you will be lucky enough to get some rain!).

Quite a few photovoltaic pumps are in use in Africa, especially in the arid Sahel countries like Mali, where they have been successful becuase they require little maintenance apart from making seasonal adjustments to the tilt of the solar cell modules and keeping them clean. Most of these use pumps made by the French company *Pompes Guinard.*

One of the biggest solar water pumping systems in the United States is at the Papago Indian Reservation, west of Tucson, Arizona, where 11 separate solar array and pump units deliver 375 to 3,200 litres of water each day from depths of 50 to 230 metres.

There is already a large range of solar electric pumping kits and systems available in Australia from solar cell manufacturers and distributors. Most of these use self-priming pumps powered by DC brush motors. Pump units may float on the surface of the water or are mounted near the water source, while submersible, centrifugal jet or jack pumps are used inside the casings of bores below 5 metres deep.

## EQUIPMENT



### Sola-Flo pump kits

**Base-mounted pump.** Pump, in fibreglass container, has floating suction line with a strainer attached. Maximum suction lift 1.5 metres. Two models, **1 590/B** and **3 180/B** have the same performances as the floating models.

Sola-flo units are sold as kits with pump, **Solarex X100GT** solar module (or modules, to suit pump requirements), electrical cable, delivery hose, suction hose and strainer. Pumps are made by **Southern Cross** and are not sold separately.

From **Solarex Pty Ltd**, PO Box 204, Chester Hill, NSW, 2162.

> **In the world there is nothing much more submissive and weak than water.**
> **Yet for attacking that which is hard and strong nothing can surpass it.**
> **This is because there is nothing that can take its place.**
> **LAO TZU, *Tao Te Ching,* trans. D. C. Lau.**

### Jacuzzi submersible pumps

Solarex has a range of deep borehole pumping units designed for use with Jacuzzi DC brush motor pumps (no inverter is needed). There are nine models which can pump water from depths below 5 metres to 120 metres at flow rates from 90 to 300 or more litres per hour.

These require bigger solar cell arrays (typically 8-10 modules) than shallow wells as they operate from 0-1200W and 0-60V, depending on the depth and flow rate of water being pumped. The pumps are self-priming once submerged and use impellers with floating seals to prevent backflow of water.

The motor and pump component range in price from $1,900 to $2,500. As various factors have to be taken into consideration, it's probably best to contact Solarex to ask for the most suitable unit for your specific requirements. The company also has a range of domestic pressure water pump and solar powered helical rotor pumping units.

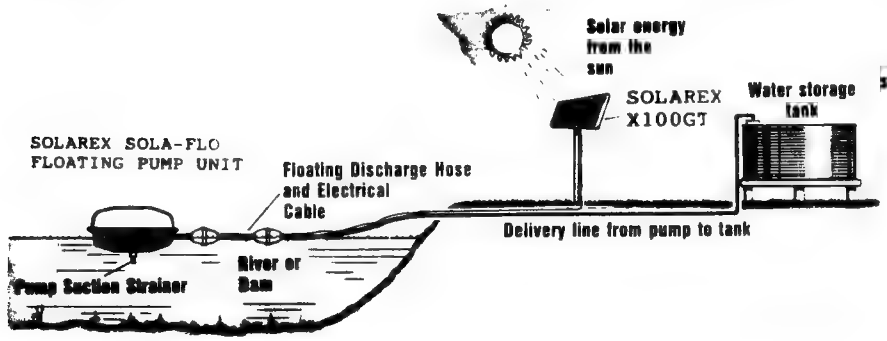
From **Solarex Pty Ltd,** PO Box 204, Chester Hill NSW, 2162.

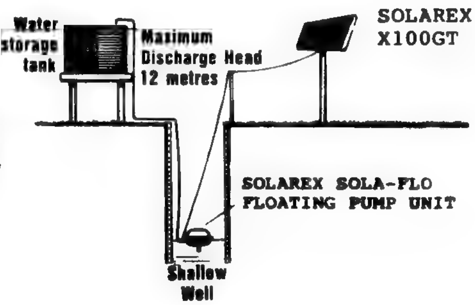
**Floating pump.** Pump, encased in fibreglass, floats on the surface of a dam, creek, shallow well or water tank. There are three floating pump packages.

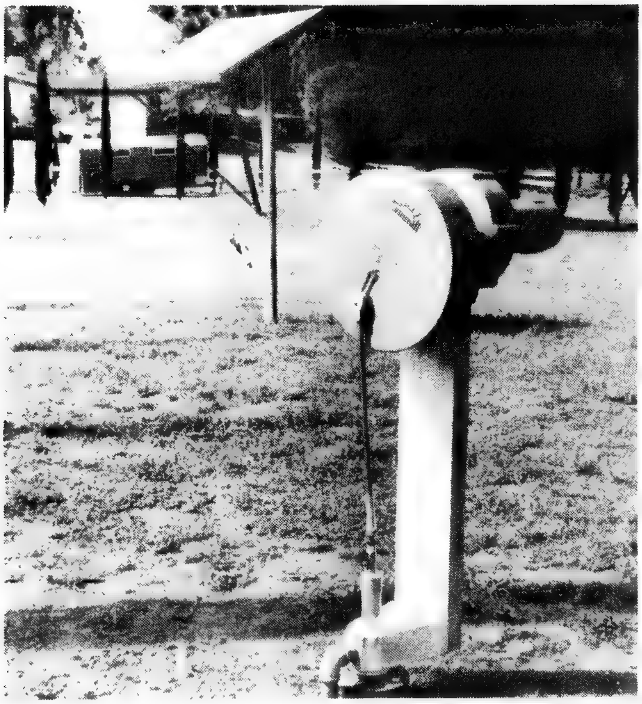
The **18 000/F** has a centrifugal pump which runs on 140W solar array, for an average daily output of 18,000 litres at a 4.6 metre head, using 40 mm hose. "Enough", says the Solarex brochure, "to water 250 head of cattle or run a small property, including domestic use". The same pump delivers 13,500 litres/day at 6.1m head. Maximum discharge head is 6 metres.

**3 180/F:** 70W array, 12m max discharge head (15 mm hose), 3,180 litres/day at 3m, 2,260 litres/day at 9.1m, 1,800 litres/day, at 12.2m.

**1 590/F:** 35W array, 12m max discharge head, 1,590 litres/day at 3m, 1,130 litres/day at 9.1m, 900 litres/day at 12.2m.


Solar energy from the sun
SOLAREX X100GT
Water storage tank
SOLAREX SOLA-FLO FLOATING PUMP UNIT
Floating Discharge Hose and Electrical Cable
Delivery line from pump to tank
Pump Suction Strainer
River or Dam


Water storage tank
Maximum Discharge Head 12 metres
SOLAREX X100GT
SOLAREX SOLA-FLO FLOATING PUMP UNIT
Shallow Well



## Sunmill solar pump

The Sunmill unit consists of a jack pump with a DC motor powered by solar cell modules. Jack pumps will pump from shallow water sources or from deep bores, to 100 metres. The jack pump includes a flywheel and gearbox to drive a counterweighted balanced crank, It is usually threaded to the top 2 inch section of the well drop pipe, resting on the well casing seal.

In a sunny area, the Sunmill will provide about 700 gallons per day from 30 metres using a four module solar array from Amtex.

From **Amtex Electronics**, 36 Lisbon Street, NSW, 2165.

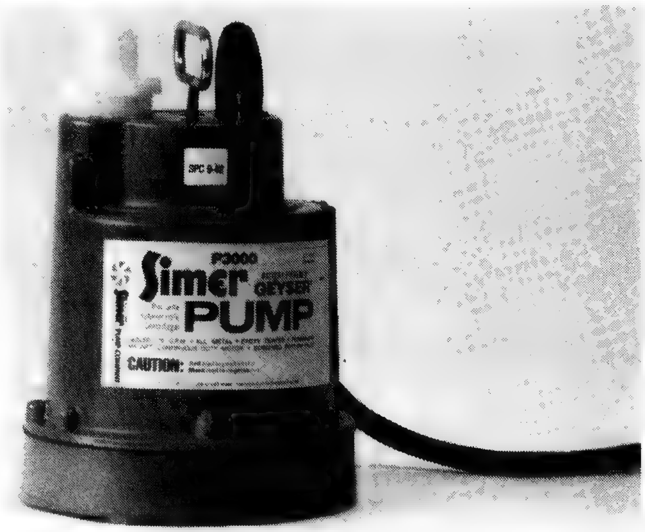
## 12 volt pressure pumps

Amtex also has for sale low-cost pressure pumps with 12V DC electric motors which may be powered by solar cells. One is the quiet **Simer** 'Noiz-less', which draws 10 amps and can be used as a fresh water bilge pump on boats.

The **Simer** 'Geyser' is a portable submersible pump which will operate on a car battery or 12V power source (draws 11 amps) to pump water for emptying tanks, swimming pools, fountains or emergencies (such as pumping out flooded cellars). Pumps to 119 litres per minute. Not suitable for salt water use. Price around $50.

The **Mini-Vac** centrifugal pump comes as a kit with 2 metre inlet and outlet hoses and clips for 12V batteries (draws 10 amps). It will lift 3m and push a further 12m (total 15m head). Not suitable for sandy or salty water. Price around $200.

From **Amtex Electronics**, 36 Lisbon Street, NSW, 2165.



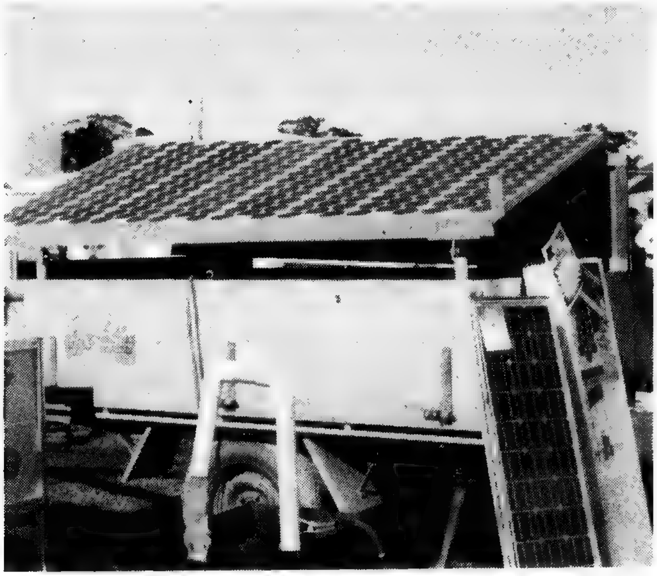
## Elders/IPS solar bore pumps

IPS offers two solar bore and lift motor and pump models:

☐ Model 1625 — can deliver 250 litres a day at a total head of 30 metres. Installed cost $7,500.

☐ Model 1690 — can deliver 250 litres a day (350 litres/day in summer) at heads to 100 metres. Installed cost $13,500.

From **Indian-Pacific Solar Electric**, 5 Park Street, Erskineville, NSW, 2043, or your **Elders, Pitt Son, AML** store.



**The trailer-mounted solar cell array of the Indian-Pacific Solar Electric photovoltaic pumping system, seen at the Small Farms Field Days at Mudgee, NSW, in July last year.**

# Water lifting water

**David Dumaresq & Jackie French**

The standard comment made by people who see our hydraulic ram — *a Billabong No. 6* — for the first time is: "How can it pump when it's water when it's out of the creek?" The answer has a long history.

We put our first ram in about seven years ago, right on the creek bank but supposedly out of the way of flood damage, and set in a large block of concrete. Eighteen months later, after 25 inches of rain in four days, it was washed away, sheared right off its concrete base and presumably bobbing out to sea some 70km away.

Because of this the second ram is well out of flood reach. It's much further up the creek bank and its concrete pad is set deep in a large hole with earth and rocks mounded up around it. We imagine that the first ram was knocked over by a passing log. If there is another flood, no logs should be able to get near this one.

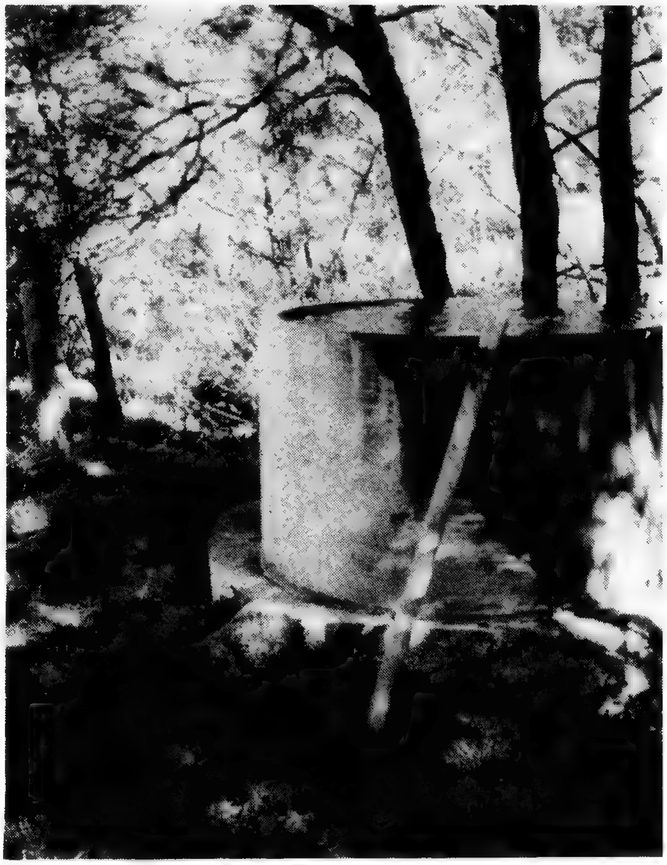
Water for the ram is provided by our farm's general watering system which is a 1km long 2 inch polythene pipe, a gravity-fed syphon. A side branch fills the hydraulic ram's header tank, made from a big 'seconds' culvert, which holds about 3000 litres. This in turn feeds about 55 metres of threaded steel 2½ inch drive pipe.

The Billabong pumps water through a 600 metre 1 inch polythene delivery pipe up a vertical rise of 70 metres to another 3000 litre header tank (another old culvert pipe). Water from there runs by gravity feed into a regular drip irrigation system for the orchards (see: *Farming with wildlife, Earth Garden 43).*

In one sense this system is wasteful: for every 10 units of water needed to run the ram, only one unit is delivered to the fruit trees. On the other hand, the unused water goes straight back into the creek. It would be possible to build a series of progressively smaller rams using the 'waste' water. We have a friend who has done this.

We couldn't use the ram for about 18 months during the drought, a definite drawback, as some water was still available through the gravity system and from pumping. But most of the time the hydraulic ram *just keeps whooshing away!* Turn it on and, while there's water, it will keep pumping.

An early problem was keeping just enough water going into the header tank to feed the ram. Too much overflowed and wasted water, too little and the ram stopped. We fixed that by putting in a float valve, which opens when the water leveldrops below a fixed point.



**Above: Out of the creek and on dry ground, the Billabong hydraulic ram "just keeps whooshing away".**

**Below: The header tank which supplies water to run the hydraulic ram is an old culvert pipe mounted on a concrete base.**

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**The highest good is like water.**
**Water gives life to the ten thousand things and does not strive.**
**It flows in places men reject and so is like the Tao.**
**LAO TZU, *Tao Te Ching,* trans. Gia-Fu Feng.**

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# Go with the flow

## Gravity flow water supply

Our gravity feed system will supply water to any part of the farm below the inlet near the top boundary. The fartherest point it waters is a stock trough, about 2 km of pipe distant and about 30 metres above the creek. I strongly advise anyone putting in a farm water system to investigate a syphon first. Ours delivers water to sites you're *sure* can't possibly be lower than the inlet . . . until you survey them.

The syphon has to be started several times a year after flooding has washed away the head of the pipe. We have sudden and very severe floods, so we prefer to sacrifice a short length of easily replaceable plastic pipe rather than risk the complete loss of a more permanent installation such as steel pipe in concrete. A chicken wire strainer on the end of the pipe is also a small loss. We find that using this system we are far less worried by floods than our neighbours who must laboriously remove expensive pumps and suction pipes at the first hint of a flood.

After years of playing around with syphons we've found that having *bleed points* — cheap gate valves — about every 50 metres on the mainline of the system allows for quick starting, venting and cleaning of the supply. This is badly needed. Because our syphon runs all the time we find that flood water tends to deposit silt and sand in the first few hundred metres of pipe. Years of restarting the syphon after flooding has shown us that using a small portable petrol firefighting pump is the best way to blast out accumulated mud and sand.

The system's 2 inch supply pipe delivers a minimum of about 3 litres a second, which is about 260 litres a day if we used all the water coming through it. Of course we don't use anything like that amount, except when the hydraulic ram is running full bore and all the other watering systems are going, which would only be a couple of weeks in the year.

For non-drinking household water, the gravity feed system supplies water to a 50,000 litre tank (a bolt-together tank on a concrete base), which in turn supplies water by gravity feed to the house, including the hot water system. We store this amount for three important reasons:

- To provide a large reserve of clean water for drought periods, which should last for two years of careful use (including no flushing toilets);
- To ensure that only clean water enters the house system, particularly during floods; and
- To provide a large firefighting water reserve close to the house.

Garden water is supplied directly from the main syphon system, which is almost continuous. At the house the pressure from the main syphon system is enough to run overhead sprinklers at about 30 pounds pe square inch (psi). Syphons have a huge advantage over pumps in a fire as they don't depend on vulnerable engines, which are often burnt. David's experience of very hot fires elsewhere is that plastic pipe tends not to burn through as long as there is running water in it.

Of course all but the head of the system should be underground anyway. With several kilometres of pipe to be buried this is a task we've yet to finish.

We've been working on our water supply system on and off for nearly a decade, adding bits here and there and rerouting pipe to get a better or more flood-proof line. We'll probably be improving it for a long time to come, but whatever additions we make will no doubt be based on the two low maintenance, non-polluting, quiet, *free* power sources — gravity and the hydraulic ram.

### Quick, cheap surveying

**By David Dumaresq**

The farm was quickly and simply surveyed for the gravity water system, usually by one person using an 8ft steel fencepost with a spirit level wired to it, a tape measure and a notebook and pencil. This is the method we used.

Hold the fence post out from the slope, keeping it level with the spirit level. Measure the distance from the end of the fencepost to the ground underneath. Move down the slope placing the end of the post into the ground at the point previously measured.

Record the measurement in a plus column in the notebook. Repeat until the lowest point is reached.

If a rise is encountered on the way, remain standing at the last point of measurement, but swing the post around until it is resting on the rising ground so that it can be held level over the spot previously measured. Once again measure the drop from the ground to the end of the post. Record this in a *minus column*.

At the end of the surveying run simply add up both columns and subtract the minus column. This will give you an accurate tally of the total vertical drop measured. One person can survey several kilometres of fairly rough ground in a morning using this method.

A word of warning: This system will only work well on fairly hilly ground. The flatter the country, the longer the measuring pole has to be to record any significant drop.

# The fuelless Platapump

The Platapump uses flowing water from a creek, river or irrigation channel to turn a series of blades or impellers on a turbine shaft to power a simple pump. No fuel or other power source is needed. With a good flow of water, it will lift 400 to 2,000 litres (100-500 gallons) of water per hour to heights of 100 to 200 metres (300-600 ft) — or more or less, depending on the site, the fall and the quantity of water passing through the turbine.

It will pump either a large quantity of water to a moderate height or a smaller quantity to a greater height, for example to a tank for water supply, trickle irrigation or livestock watering. It will work in fairly shallow water on an intake head as small as 230 mm (9 inches) and with a water flow of only 1 cusec (28 litres per second).

Dimensions of the Platapump are: length 3.2 metres (10 ft 6 inches), width 736 mm (2 ft 5 ins), height 965 mm (3 ft 2ins). Weight is 170 kg. The pumping unit consists of two vertically opposed brass reciprocating piston pumps with an adjustable crank to vary the stroke length to suit different output volumes and delivery heads.

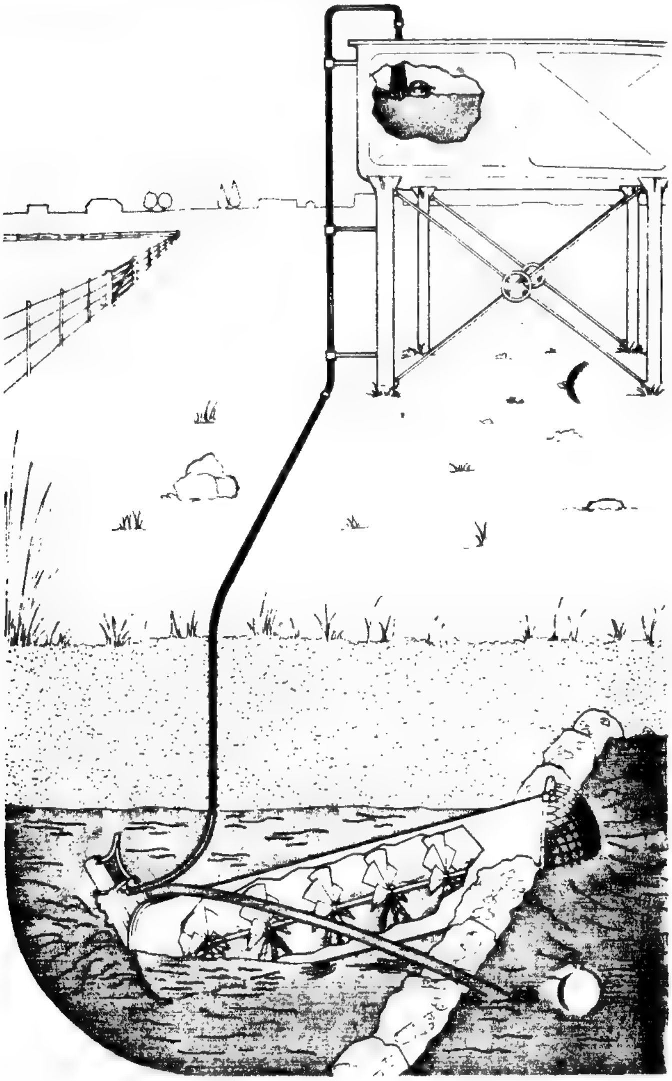
Due to the simplicity of the design, little maintenance is needed. Water intake is protected against debris by a mesh grid, the turbine casing is made of fibreglass and bearings are water-lubricated.

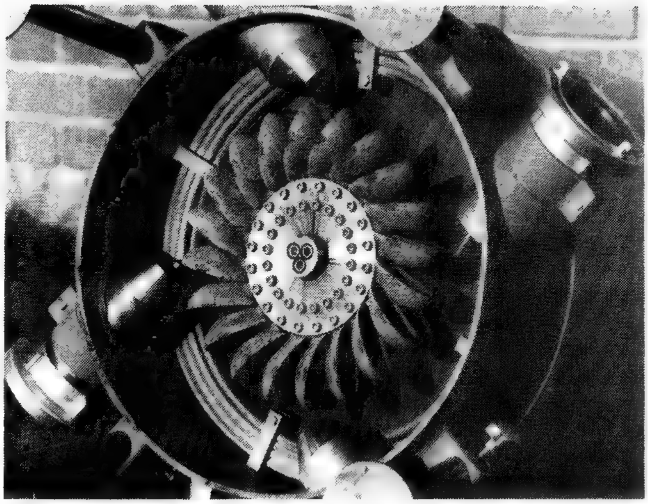
In normal working conditions the Platapump need a natural fall in the watercourse, over the length of the turbine casing, of 915 mm (3 ft) and a flow of 3 cusecs (85 litres/sec), but it will work on a minimum natural fall of 635 mm (2 ft 1 ins) and a water flow of 1 cusec (28 litres per second and a maximum natural fall of 1,220 mm (4 ft) and flow of 6 cusecs (170 litres/sec).

Where the natural fall in the creek is less than 305 mm (1 ft), the makers suggest that a small dam be built at the upstream end, using sandbags, rocks or tree trunks and plastic sheeting to increase the fall and divert more water through the turbine. Digging a channel to seat the downstream end of the turbine, thus increasing the tilt of the turbine, will also increase the fall through the intake head and consequently its performance.

The turbine actually generates maximum power when its body is just over half-filled with running water. While experimenting, the inventor of the Platapump, Roy Martin, of Dunedin, New Zealand, found that each set of blades adds to the energy generated. "I dropped a prototype into a creek," he relates. "When the cylinder filled with water the turbines hardly turned at all, so I left it there." During the night the water level dropped. "In the morning I came back and it was going flat out. It didn't take long to figure out that a small flow of water was the most efficient."

**PLATAPUMP**
☐ Send SAE for further information:
**Cooma Rural Services,** PO Box 832, Cooma, NSW, 2630.
**Plata Power Ltd,** PO Box 221, Dunedin, New Zealand.





# Water power

Small water-powered generators or *Micro-hydro systems* (MHS) as they are now often called, can provide electricity economically in remote places provided there is sufficient energy in the form of flowing water at the site.

There must be a fall of water with good *head* (the total distance the water falls) and rate of *flow,* both of which should be measured before you think of buying a turbine or any other type of water power equipment. A waterfall or a swiftly flowing stream in a mountainous area is ideal. A Micro-hydro system should be competitive with the connection fees and regular charges required by the electrical authorities to connect the mains service.

A good point about water power is that flowing streams provide constant power, day and night, though this is always subject to seasonal changes, and most streams are lower for several months during summer.

We've found it difficult to track down suppliers of water turbines in Australia, but recently we ran across the *Transportable Hydraulic Energy Plant* (THE), made in Linz, Austria and imported into Australia by Antelope Engineering of Sydney.

The larger THE model uses a Pelton wheel (shown in the photo) in a lightweight metal casing (total weight 75 kg, height 1.1m). It is capable of generating a maximum of 4 kilowatts (kW) of 110V or 240V AC at 50 cycles (Hz). It needs a minimum head of 20 metres with a flow of 34 litres per second to acheive this output, or a 40m head with 18 litres/sec flow, or a 65m head with 12 litres/sec flow.

The turbine may be adjusted to head elevations ranging from 20 to 110 metres by varying the number and diameter of the four nozzles which provide the water jets for the Pelton wheel buckets. Price of this model ex-Austria is around $9,500, to which import costs must be added.

There is a second THE Model with an output of 150 watts (W) for trickle charging a deep cycle battery. Price is around $2,000 ex-Austria. Electrical regulators are incorporated in the units, which are also designed to function without oil.

☐ **Transportable Hydraulic Energy Plant.**
Send SAE for further information to:
Antelope Engineering Pty Ltd, PO Box 271, Milsons Point, NSW, 2061.

# Windmill and pulleys bring water up the hill

**A problem in hilly country is that the water resource is commonly in the valley where there is little wind energy, whereas up on the ridges the wind rages but there is no water. Thus the application of wind-pumps is limited.**

**A method of connecting a remote pump to a windmill via a series of pulleys and a wire rope is described, together with some operating experience of what is probably the only installation of this type in Australia. Some tricks about windmills and pumps are mentioned, while a few myths are exploded.**

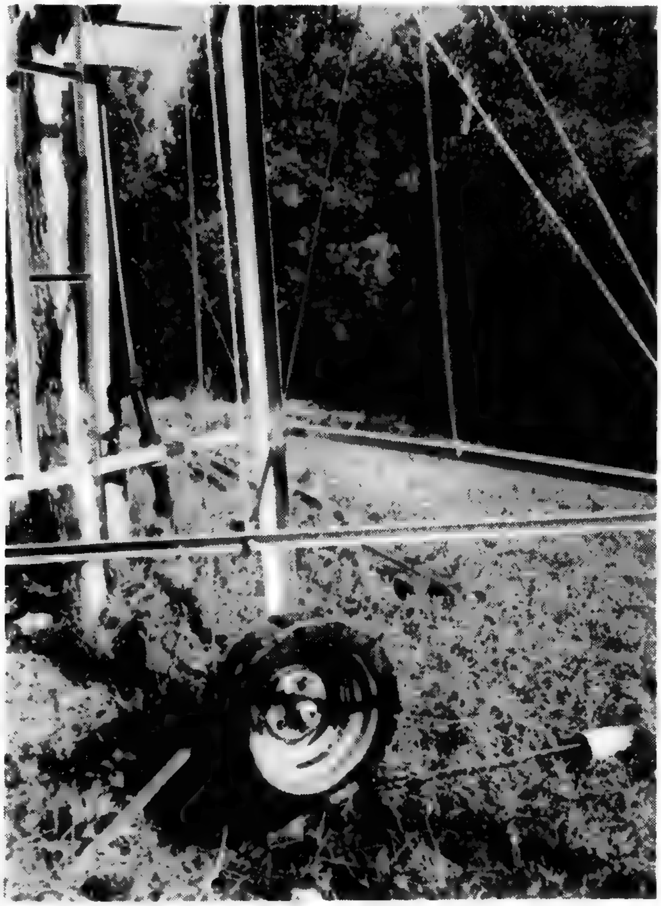
### By Lindsay Corben

The water is pumped from a large dam to a tank about 40 metres vertically above the top water level of the dam. The distance along the slope is about 140 metres. The windmill, a **Southern Cross** with a 3.7 metre fan and 9 metre tower, happens to be adjacent to the tank.

The Southern Cross pump has a 62mm diameter main piston and a 31mm diameter differential piston and is located on the edge of the dam. It has an 82kg reinforced concrete weight mounted on the top end of the pump rod.

A wire rope connects to the drive rod just underneath the windmill gearbox, passes around a pulley at the base of the tower and then via 10 pulleys on bush poles to a final pulley directly over the pump. The wire rope lifts the weight and pumps water on the 'up' stroke and the weight pushes the pump-rod down on the 'down' stroke, pumping again and so pulling the rope back down.

The pulleys are all old car wheels (Holden and Valiant) which have excellent weatherproof bearings. As the terrain between the windmill and the pump has its ups and downs, the rope is simply hooked over the highs and under the lows. Tall poles up to 3 metres in length are used in the hollows and short ones, down to 1 metre in length, on the bumps. Pulleys are spaced about 14 metres apart.



The wire rope is 7mm diameter galvanised irrigation rope (used for rain guns) with a steel core rather than hemp to minimise stretch.

**Performance**

A water meter at the pump gives a weekly record of production and, indirectly, an indication of wind energy variability. Production has been as high as 10,000 litres in one memorable day and averages 2,140 litres per day over a couple of years (1000 litres equals 220 gallons). The pump supplies four dwellings with modest needs and the tank

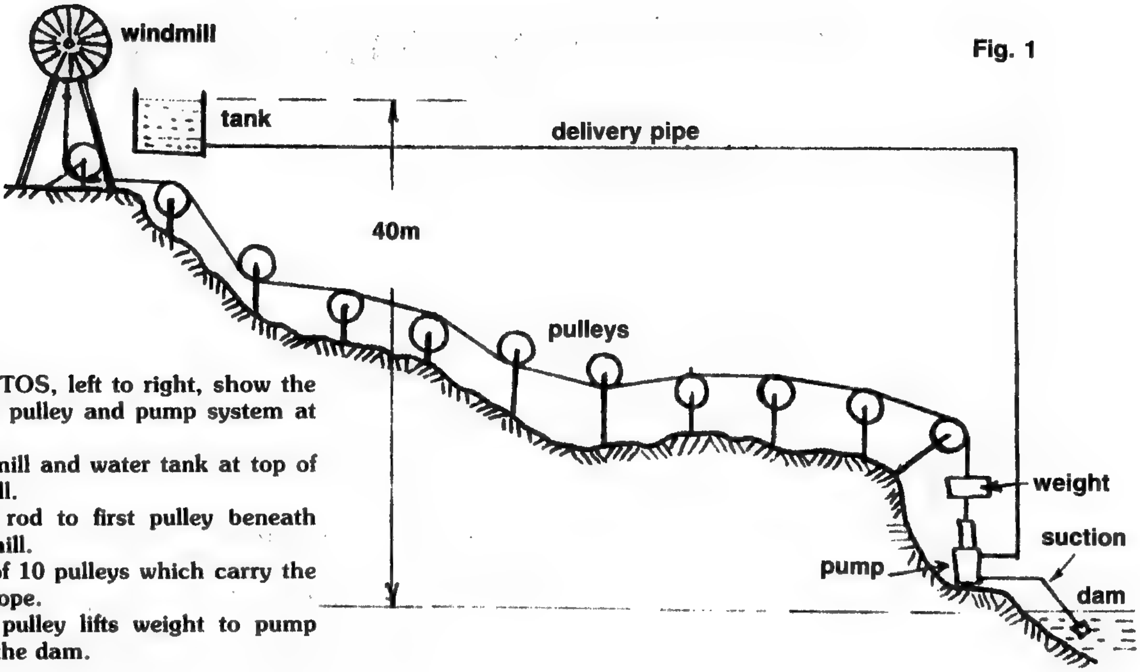
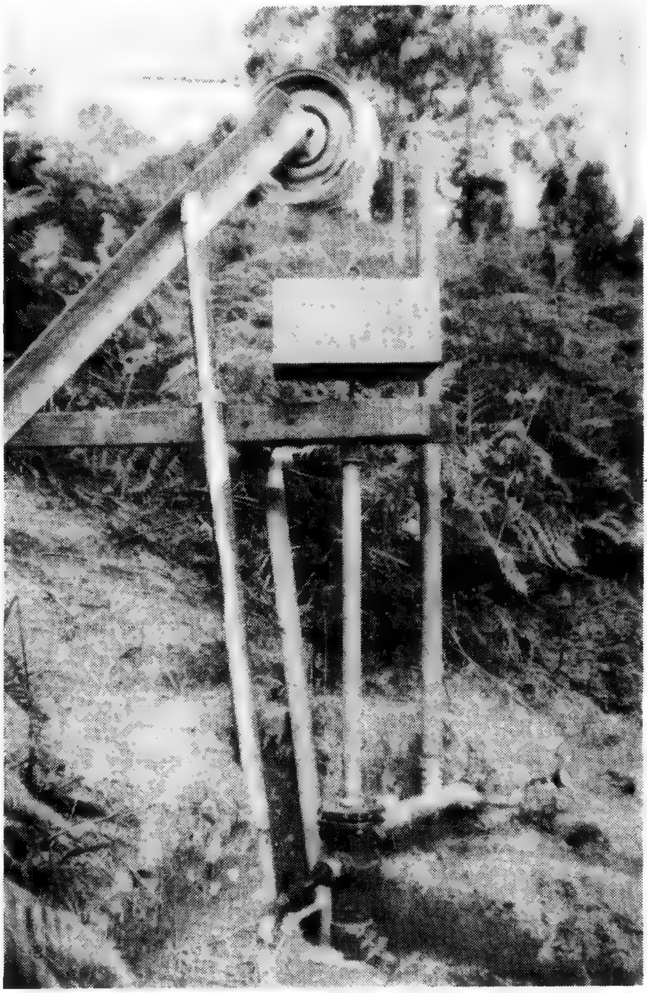


Fig. 1

**PHOTOS, left to right, show the windmill, pulley and pump system at work:**

1. **Windmill and water tank at top of the hill.**
2. **Drive rod to first pulley beneath windmill.**
3. **One of 10 pulleys which carry the wire rope.**
4. **Final pulley lifts weight to pump from the dam.**



overflows into a pond from which six other houses draw household and garden water. In dry periods the total demand requires augmentation by an engine-driven pump, but very little engine work has been needed in recent seasons.

The production figures for this installation are certainly less than for a windmill driving a pump at its base in the normal way because nearly half of the stroke of the windmill is lost in elastic rope stretch. But if the windmill and pump were both located at the dam, production would be negligible as the dam is very sheltered.

Heavier wire rope would increase the pump stroke, but would also require more pulleys to reduce the sag. As usual, a compromise must be reached between production and the input of time and money.

### Problems

We wear out the top pump leathers more quickly than we should and this has been due to our lack of appreciation of the need to precisely align the pump-rod. With that concrete weight mounted on it, it wants to wander about a bit. A system of guide rods is on the drawing board.

There have been minor problems with the rope fatiguing over the pulleys, especially where the angle turned through is large. With spare rope available we can move the rope along to avoid continuous contact in one place. The pulley diameter (the 'well' of the wheel rim) is about right according to the rope manufacturer's specifications, but it does appear that larger pulleys would be better. Another reason for not using a larger rope is that larger pulleys would also be necessary.

### Other examples

The only other similar installations I know of in Australia utilise a series of wooden rods to connect a windmill on the bank of a river to pump at the water level. My inspiration came from a traditional community in the United States where energy has been transferred in this way up to 800 metres for generations. There are other solutions, for example a wind generator with electrical connections to a motor at the pump.

A New Zealand invention with which I had a small association uses a delivery pipe to send energy down to an energy storage device; then in a cyclic manner the stored energy returns more water to the top via the same pipe. As far as I am aware, the bits are not commercially available and our system of wire rope and pulleys has the advantage of simplicity.

### Windmill/pump relationships

Water pumps of any kind cannot suck a full pipe of water more than a theoretical vertical head corresponding to the atmosphere pressure, which is about 9 metres. In practical terms, a pump 7-8 metres above the water is about the limit.

Once the water is sucked into the pump, the head to which it can be forced is a matter of relating the pump to the requirements. If a given windmill can pump 10,000 litres per day to a head of 30 metres, the same windmill can handle about 5000 litres per day to a head of 60 metres, but the second pump will have half the piston area of the first. The higher you wish to pump, the smaller the average quantity of water you can expect.

If you try to use a pump suited to a 30 metre head to pump to 60 metres, you will be straining the whole outfit and will probably only get water delivered in severe winds (when you should perhaps turn the windmill off, anyway). If you use the same pump to lift the water 15 metres, the windmill will be quite relaxed, but you will not get nearly as much water as you would if the pump matched the job. It is possible to reduce or magnify the pump stroke by lever or pulley systems, but care is needed. Most pumps require precise alignment of the pump-rod or the leathers will be worn very quickly.

### Pumps

Windmill pumps are positive displacement piston types, operating at about 20 strokes per minute on average. Each stroke corresponds to a fixed amount of water and if you forget to open the output gate valve, the pump will build up enormous pressure and probably get an expensive hernia. On the other hand, centrifugal pumps rather enjoy pumping into a brick wall. Have you noticed that if you block the air in a vacuum cleaner (a centrifugal air pump), the motor speeds up? A vacuum cleaner's life is easier with a blockage, but people and windmill pumps are different.

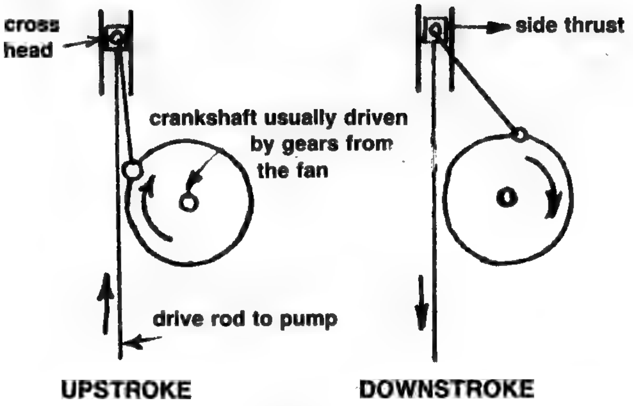


Fig. 2

Typical windmill pumps (and Southern Cross must surely be typical) are double acting, pumping on both the up and down strokes. They have two pistons, a lower one in the main body of the pump and one of half the diameter at the top. This achieves double action and avoids that vulgar 'stuffing box'. If you do your homework on the forces on the pump-rod (neglecting the suction forces), you find that the force to pull the rod up is three times the force to push the rod down and this fits the windmill mechanism.

The crankshaft is offset relative to the line of the pump-rod drive, so that the upstroke is very direct, but the downstroke involves significant side thrust (**Fig 2**). For this reason it is not wise to ask your windmill to push down to a greater extent than designed, while it is happy with push-ups galore. Naturally the pump delivers three times as much water on the upstroke as it does on the down.

### Air domes

With reciprocating pumps (and hydraulic rams) the output is essentially pulsating. An air dome at the pump smoothes out the flow, reducing friction losses in the delivery pipe. The dome can be simple — we use about 2 metres of 50mm galvanised iron pipe capped at one end — but some means must be provided to keep the dome supplied with air, as the air tends to dissolve in the water.

Most pumps will have a sniffer valve, an adjustable small hole that sucks in a bubble of air on the suction stroke, passing the air into the dome.

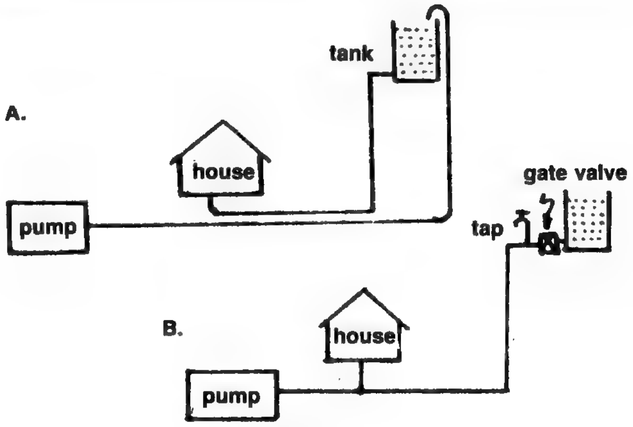


Fig. 3

**Myths**

**1.** There seems to have been a conviction around for generations that one pipe is needed to deliver water to a tank and another to draw water from the tank (**Fig. 3a**). This may be good for the trade, but it is quite unnecessary.

The system is **Fig. 3b** works just as well, both in theory and in practice. The only disadvantage of the single pipe system is that you cannot directly see the water falling into the tank when pumping. However, if you are keen on watching the delivery, you can do so by closing the gate valve and opening the tap. I used such a system in association with a hydraulic ram, where it is often useful to know the rate of delivery, which is easily checked with a bucket and a watch.

**2.** I have been told that if the hill between the pump and the tank is very steep it is more difficult to pump the water. Not so. The difficulty is only related to the vertical height between pump and tank, plus friction losses in the pipe. Thus the steeper the slope the shorter the pipe and the less the friction loss. With hydraulic rams and windpumps with air domes the flow is small, thus friction losses are negligible anyhow.

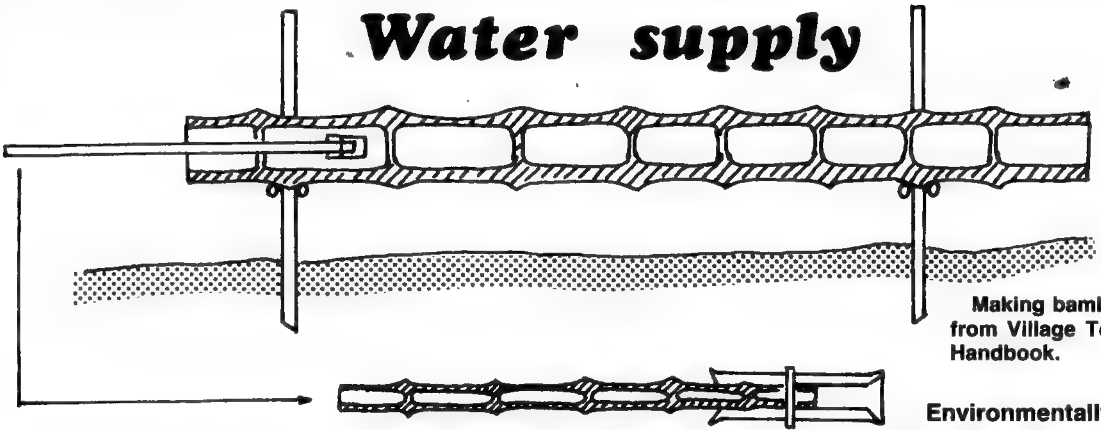
**3.** Imagine the Tumut Pond Dam wall of concrete construction. Empty the pond and build another wall, upstream but 10mm away from the first wall. Fill the 10mm crack with water to the normal high water mark. The myth in this case is that the forces on the original wall would be less when all those kilometres of water upstream are removed. They are the same. It is the heigh of the water that causes the forces, not the volume. Perhaps it would be helpful to understand this puzzle if we are dabbling in hydraulics.

**4.** Telfon tape wrapped around galvanised iron pipe threads before assembly makes it easy for amateur plumbers to avoid leaks. The myth is that it also stops leaks if it is wrapped around the threads of black poly pipe fittings, such as joiners. I have seen kilometres of the stuff wasted in this way. The water seal in these fittings is made between plastic flanges or soft plastic sealing rings which are squeezed together by the threads. Taping these threads has as much logic as taping the wheelnuts on your car to stop petrol leaking.

**Reference**

For technical details of the design of the wire rope system see **Oscillating wire power transmission** in **south wind,** bulletin of the Australasian Wind Energy Association, No. 16, Spring, 1984, pages 22-23. Subscription is $12.00 for four issues, from AWEA, GPO Box 1965, Canberra, ACT, 2601.

# *Water supply*



**Making bamboo pipes, from Village Technology Handbook.**

## VITA PUBLICATIONS

Books and leaflets published by Volunteers in Technical Assistance (VITA) are especially strong on water supply, methods of shifting water and the use of water power. They are written in a simple style and usually well illustrated. VITA publications may now be ordered by mail from the Australian agents, Self Sufficiency Supplies, who carry the titles relevant to our conditions.

### Village Technology Handbook

390 pages, $12.95

This manual, first published in 1963, is especially recommended. About the first third of the book covers developing water sources, wells and springs, digging wells, drilling bores, bamboo pipes, water lifting, pumping and storage, dams and water purification. Also covers food preparation and sanitation. A classic of the appropriate technology field.

### Low-cost development of small water power sites

Hans W. Hamm, 44 pages, $6.50

Describes construction of a small dam, Michell (Banki) turbines and water wheels (also reprinted in **Cloudburst I**).

### Overshot waterwheel: Design and construction manual

74 pages, $7.95

Build an overshot waterwheel to pump water, grind grain, press oils or sugar cane.

### Small Michell (Banki) Turbine

W. R. Breslin, 58 pages, $8.95

Expands on **Low-cost development of small water power sites** to give full details of building a powerful AC/DC electric turbine.

### Environmentally sound small-scale water projects

Dr Gus Tillman, 142 pages, $7.25

A primer on planning a village level or small community water supply.

### Hydraulic ram

Allen Inversin, 50 pages, $6.50

Build a low-cost hydraulic ram which requires no welding; simplification of the ITDG ram, made from pipe fittings.

### One kW river generator

leaflet, 9 pages, $2.60

Operates at flow of 2m/sec with 80 per cent efficiency for each of 3 'V' belt speed-up stages.

☐ **VITA publications.**

Available by mail at prices marked, plus $1.50 per title postage, from:

Self Sufficiency Supplies,
Shop 3, Clyde & Forth Streets, Kempsey, NSW, 2440. Or send 50¢ for a price list of other VITA publications

☐ **Catalogues**

Self Sufficiency Supplies mail order product catalogue and separate mail order book catalogue for 1985 are out now at $2.50 each posted, from the same address.

# Homebirth

There is now a national homebirth organisation in Australia for women who want to have their baby in familiar surroundings, safely, as an alternative to the hospital experience.

Homebirth Australia was formed last year at the 5th National Homebirth Conference held in the Blue Mountains, NSW, at the Easter weekend in 1984. There were over 150 participants at the successful conference.

In the year following the 1983 Homebirth Week over 1,200 babies were born at home in Australia and some 30 homebirth support groups have now been established. Homebirth Australia will support these groups and will actively campaign for Medicare benefits for homebirths. It will seek a wider understanding of homebirth in the community and education within medical and nursing institutions.

The quarterly newsletter, also called **Homebirth Australia,** is $10.00 annually. For further information, or for a catalogue of mail order books, send SAE to: Homebirth Australia, PO Box 107, Lawson, NSW, 2783.

### The 1985 National Homebirth Conference

April 5-8 (Easter weekend), at Sawtell, NSW.

Contact Pauline Murray, C/- 29 Park Beach Road, Coffs Harbour, NSW, 2450. Phone: (066) 52 8111 (office hours).

### The Birth Revolution

Edited by Wendy Whitton

Second Back Row Press, Leura, NSW, 1984, paperback, 220 pages, illustrated by Robin Norling. Price $9.95.

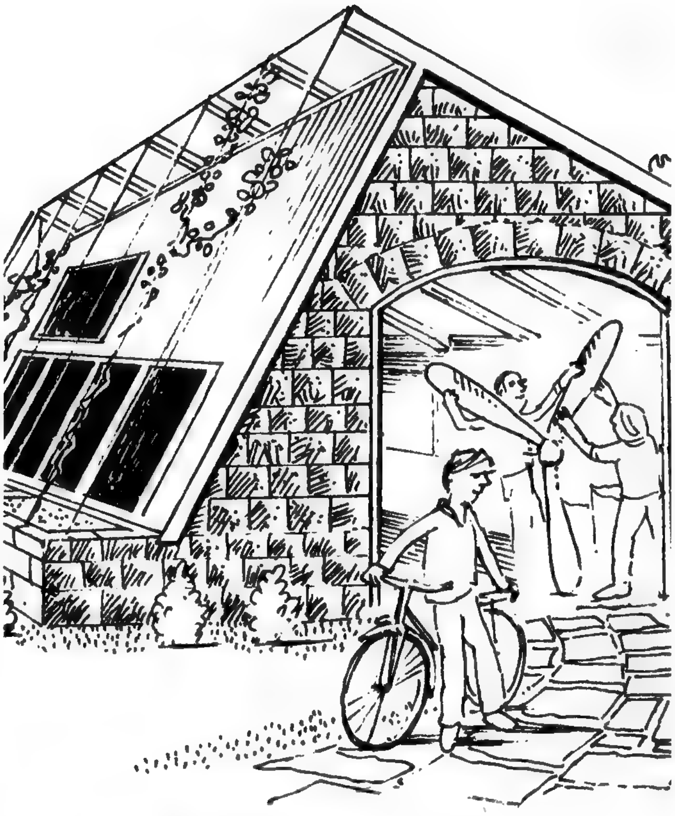
Available from Second Back Row Press, PO Box 43, Leura, NSW, 2781. Add $1.00 for mail order.

This major book on homebirth in Australia is another result of the 5th Australian Homebirth Conference in the Blue Mountains.

As well as an account of the conference and the resulting actions taken, it gives an idea of the scope and direction of homebirth today. It aims to show the possibilities, probabilities and problems of having a baby at home.

Contributors to the book include doctors, midwives and homebirth activists and, of course, mothers and fathers, who give advice, reports and contacts which should help any prospective homebirthers to make up their minds.

It's a well produced book, with photos, drawings and lists of State-by-State contact groups, as well as homebirth statistics. Lots of familiar names and faces among the contributors!



# Energy for the people

### By Gloria Scott

**The solar workshop being built by the Alternative Technology Association (ATA) at Brunswick, Melbourne, will be a centre where alternative technology equipment can be built and tested. It will also act as a model or example of what can be done with renewable sources of energy at the community level.**

**Gloria Scott, a member of the ATA, discusses conserver society (CS) principles on these pages and describes the energy systems in the solar workshop overleaf.**

The community solar workshop is nearing completion at the Centre for Educational Research in Environmental Strategies (CERES) at Brunswick, Melbourne.

Because the nature of the building deviates from conventional types of construction, negotiations with the Brunswick Council and the CERES group went on for over 18 months. The problem was to obtain local council approval for the building plans. Well organised working bees got to work clearing the land early in 1984 and the workshop reached lock-up stage in October.

The plan to build a solar workshop that would present alternative or appropriate technology is the context of energy conservation came into existence late in 1982. The idea originated as a place where members of the local community could build and test their own solar equipment. People in today's society need to be educated to accept the technolgical developments that have increased our ability to harness power from the sun.

Grants were received from the Victorian Solar Energy Council and the City of Brunswick Electricity Department, but further donations of cash and building materials will be gratefully accepted. The completed structure will contain a main room for the workshop and meetings, with two small rooms for an office and a tool store, with toilets, washing and first-aid facilities also available.

The building is built of bluestone with a huge concrete slab foundation. Stonemasonry apprentices from Collingwood College of TAFE built the west wall with its massive bluestone arch over formwork built by students from Preston TAFE.

**Concepts**

The concepts of the autonomous energy house and autonomous energy communities (self-reliant in providing their own water supplies, lighting and power) are being pioneered by 'alternative lifestylers' in Australia. Environmental and social considerations have led these people to the view that the most desirable use of solar energy should be small and local, rather than large and central.

The alternative lifestyle movement is striving for a holistic, co-operative and ecological way of life. As the environmental and alternative lifestyle movements grow in Australia, perhaps there will be a growing realisation by the mass of the people that we need not use as much energy to maintain current favoured lifestyles.

**A Conserver Society**

Many people and groups such as the Australian Conservation Foundation (ACF), Friends of the Earth (FOE) and others are beginning to value the conserver ideal of avoiding waste, conserving energy and buying ecologically-sound products. There may be a substantial reduction in energy consumption, without abandoning many of the aspirations and material comforts of the average suburban resident.

The solar architect and designer of energy systems should try to provide conditions that will help people achieve an improved quality of life, though quality of life is not increased by an excess of material possessions, even if they do raise the standard of living.

The solar workshop is a model of small-scale developments in alternative technology that will contribute to the education of people by demonstrating the long-term advantages of renewable energy use. It is important that people learn the potential dangers of the continuing growth of the existing energy system.

The community solar workshop promotes solar energy use through these consumer society (CS) initiatives and underlying values:

**CS Initiatives**

1. **Scale** — small and local solar energy systems will teach people to be more conscious of energy conservation and ecological preservation.
2. **Self-reliance** — 'do-it-yourself'. Small scale autonomous energy systems will increase individual understanding and participation in the energy system.
3. **Low cost** — recycling, barter and savings in the cost of fuel.
4. **Work/leisure** — neighbourhood centred participation and co-operation in community based workshops.

— support to small backyard industries and community projects.

These practical considerations are incorporated into the organisation and production of the solar workshop.

**CS Values**

Freedom, self-determination, autonomy, connectedness, equity, security, diversity, simplicity, thrift, humility, craftsmanship, neighbourliness.

A person's values determine their approach to the scale of things and to whether they become a consumer or a conserver. The CS values are not ranked in any order as they interact with each other at random. They create the freedom for people to be as they are, in an independent and natural way, without fear or an expectation of conformity from each other.

Today's large-scale dominant energy technology tends to reinforce the authoritarianism and bureaucratic control in both government and corporate realms. The traditional CS values have been lost in a society that values a precedence of materialism. Our governments have suppressed the development of alternative technology in the past, by encouraging a commitment to more growth and energy use, at the expense of community control over day-to-day lives.

A community may be organised around small-scale solar energy use because the provision of energy is central to all the vital social functions. Community-based solar workshops could be built near houses in suburban community centres. The ATA model of a local solar workshop is an example of what a small group of people can 'do' to create an awareness of the integral part that the energy system can attain in a community.

This model demonstrates the CERES assumption that needs for alternative energy utilisation, barter, food production, livestock, recycling and water storage will provide opportunities for people to socialise within the wider community. It is envisaged that community-run areas would be set aside for these activities. The main activities would centre around neighbourhood participation and co-operation in small community groups.

There is a need for approximately 20 per cent of the population to introduce and practice CS initiatives. This would establish leadership towards societal change that is based on personal values. Alternative lifestylers are beginning an effective movement to conserve energy by improvising practical projects that prove it is possible. But government support is necessary to encourage co-operatively-owned associations in the utilisation of small solar energy systems, which would greatly reduce fossil fuel consumption.

If Australia increases its use of large-scale energy production, then damage to the ecosystem and the social system would reduce their capacity to provide quality of life. But the increased use of renewable energy, using appropriate small-scale technology, need not damage these basic life-support systems.

## ALTERNATIVE TECHNOLOGY ASSOCIATION

366 Smith Street, Collingwood, Victoria, 3066. Phone: (03) 419 0250 or 419 8700.

The Alternative Technology Association (ATA) aims to encourage an interest and understanding of solar energy use and energy conservation in the local community. This approach will help to create an awareness of the need to conserve natural resources and to protect the environment from pollution.

The group conducts regular meetings, workshops and field days and produces the magazine *Soft Technology*, issued six times a year.

# SOL

By Gloria Scott

**Autonomous energy system.** An innovative quality of the solar workshop is to promote autonomous energy systems that need not be connected to a central energy supply, in other words, they are self-sufficient in energy. The workshop will produce its own energy for heat, electricity and hot water by a combination of renewable energy inputs:

**Passive solar design** may be defined as the design of a building to make use of solar energy and the environment to achieve the maximum cooling effect in summer and the maximum heating effect in winter.

The main room is designed as a passive solar collector with bluestone walls and a concrete slab, which provides a large **thermal mass** to store daytime heat and release it through convection at night.

There is a **northern orientation** with a wall of fibreglass material that is inclined at 60° to maximise winter sun. **Shading** will be provided for the summer by deciduous creepers (e.g., a grapevine), which will grow on a trellis in front of north-facing fibreglass.

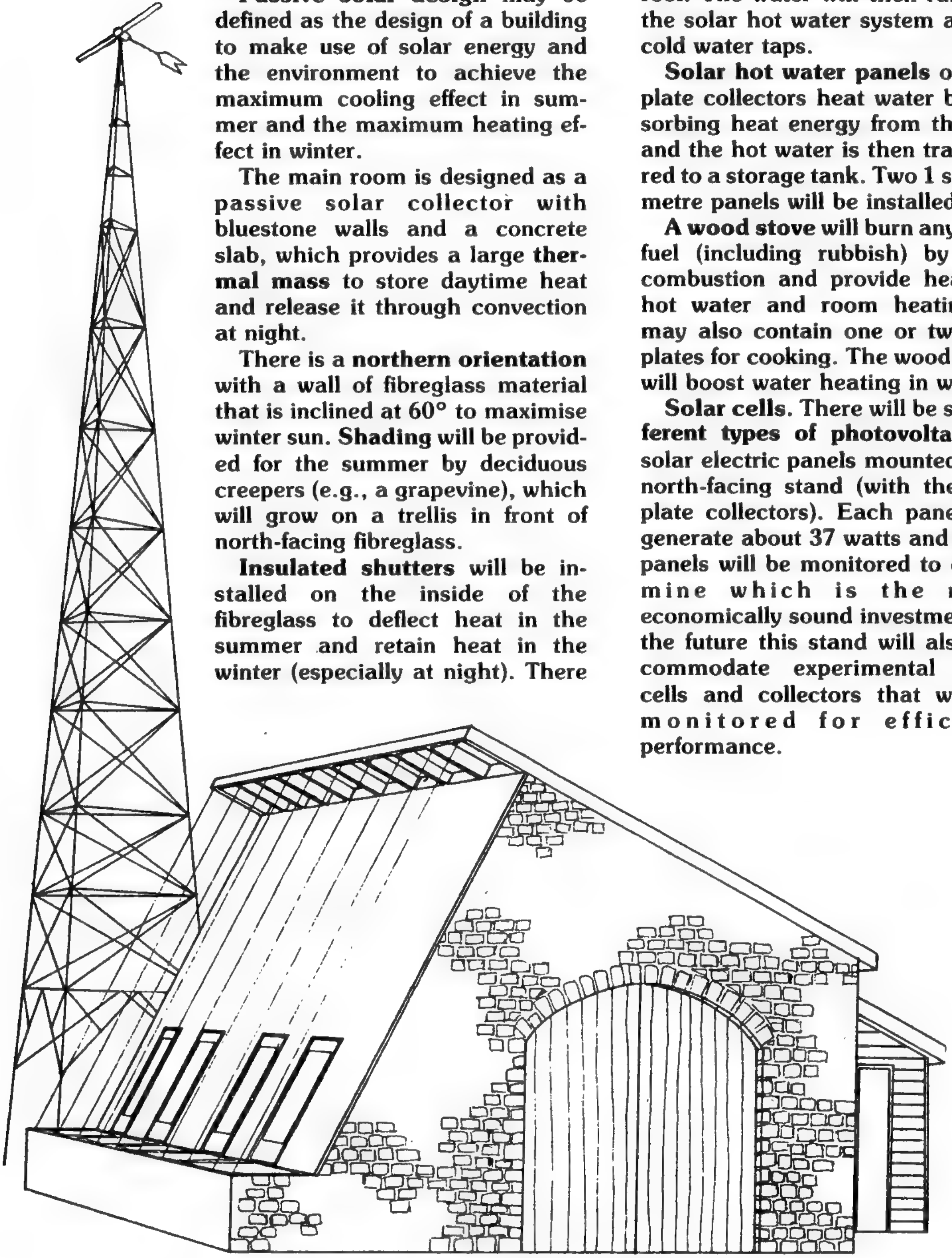
**Insulated shutters** will be installed on the inside of the fibreglass to deflect heat in the summer and retain heat in the winter (especially at night). There are large **vents** in the south walls and along the top of the building. In summer, hot air may be expelled near the roof and cool air drawn in from the south. In winter, a low-speed fan will prevent hot air accumulating near the roof.

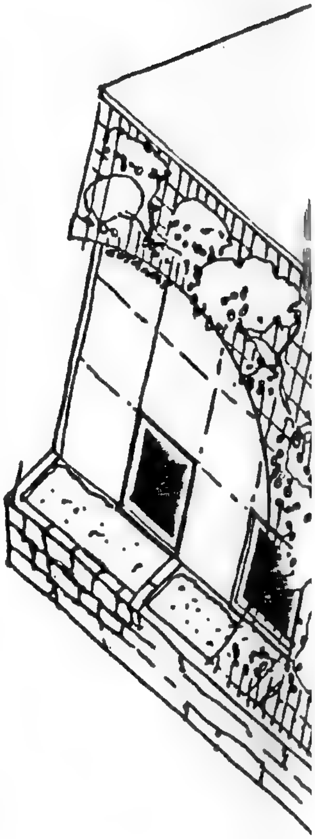
**Water** will be collected from the roof and then run into a tank at ground level. Adequate water pressure will be obtained by pumping this water into a tank in the roof. The water will then run into the solar hot water system and to cold water taps.

**Solar hot water panels** or flat-plate collectors heat water by absorbing heat energy from the sun and the hot water is then transferred to a storage tank. Two 1 square metre panels will be installed.

**A wood stove** will burn any solid fuel (including rubbish) by slow combustion and provide heat for hot water and room heating. It may also contain one or two hot plates for cooking. The wood stove will boost water heating in winter.

**Solar cells.** There will be six **different types of photovoltaic** or solar electric panels mounted on a north-facing stand (with the flat-plate collectors). Each panel will generate about 37 watts and these panels will be monitored to determine which is the most economically sound investment. In the future this stand will also accommodate experimental solar cells and collectors that will be monitored for efficient performance.





**A wind generator,** v
modified 1928
starter/generator h
donated by Survival Tec
Croydon (Melbourne).
mounted on a 20-metre
is expected to generate
Some maintenance
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**A water wheel** will b
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It will be about 2
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200-300 watts continuo

**A backup generato**
used if the other sourc
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generator will be r
renewable oil fuel
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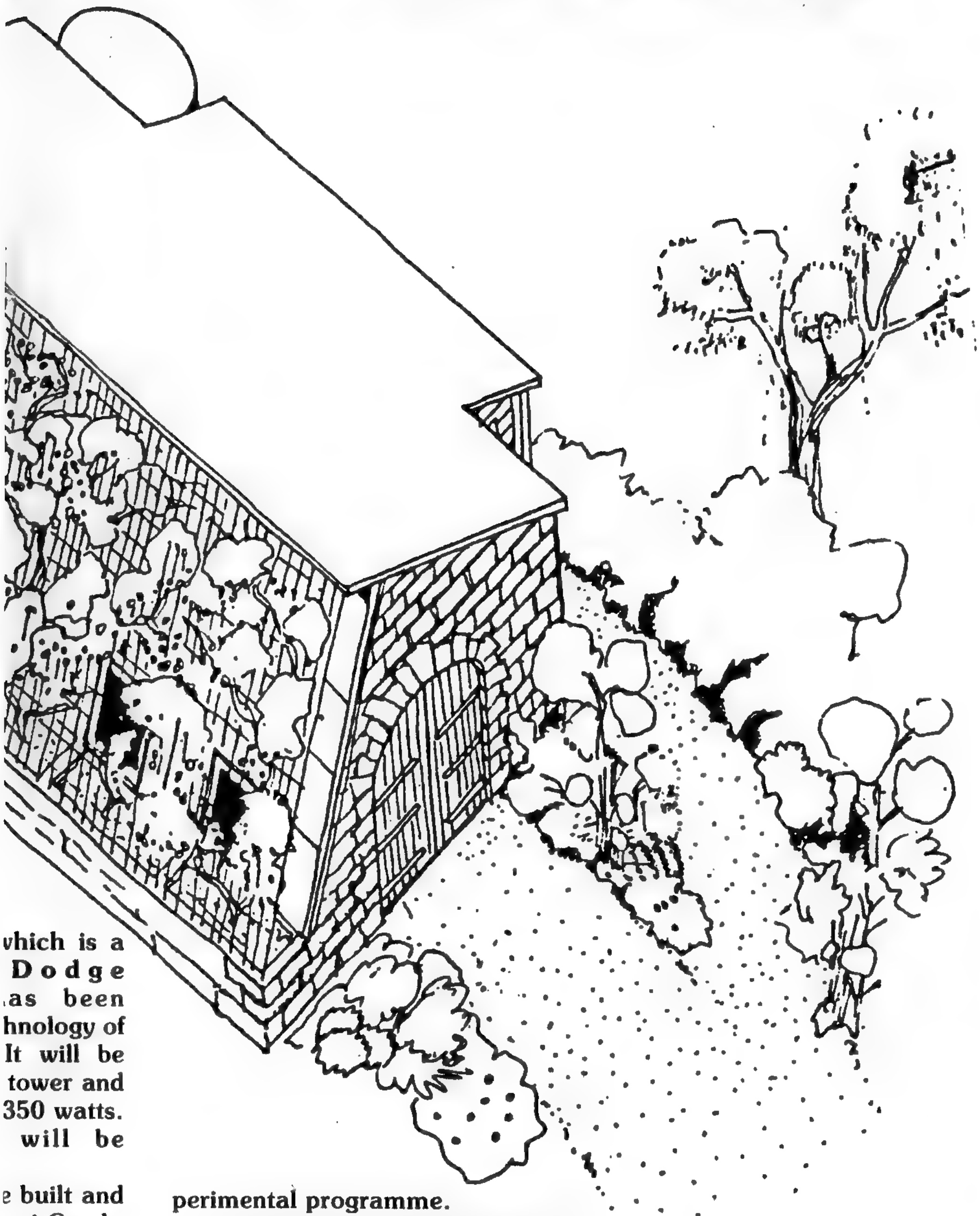
fuels will be tried out

# AR WORKSHOP



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in an experimental programme.

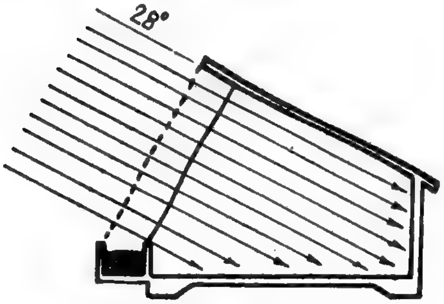
A special type of inverter will integrate all the energy sources for electricity to provide 240 volts AC (alternating current) power to run tools and appliances. It will deliver a continuous 5 kilowatts (kW) and up to 8kW in bursts. Therefore the electrical system will be a dual voltage, with low voltage DC (direct current) for lights and 240 V AC to operate workshop equipment. This energy system will be very efficient and it will cost under $1000.

Artwork by Simon Harvey

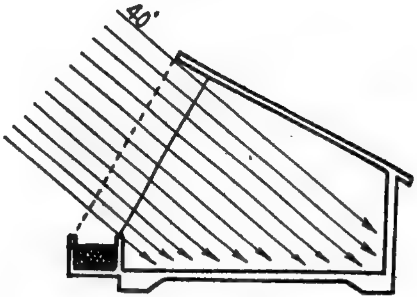
**THERMAL MASS**

Thermal mass is an object's capacity for storing heat. Matter with a high thermal mass may be useful for storing large quantities of heat in a small volume, eg. water and granite.

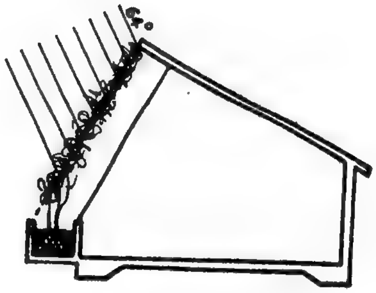
**Solar penetration through the year.**
**Solar angle at midday.**



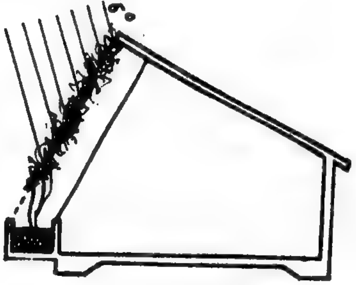
June 22 –



August 22 –



October 22 –



December 22 –

Grape vine or shadecloth shuts out summer sun.

# Low voltage appliances

### By Peter van der Wyk

## CONVERTING A MAINS ELECTRIC SEWING MACHINE TO 12V DC

Personally, I prefer a treadle sewing machine to an electric machine. For my own use I have converted a Fancy Stitch type electric machine to fit onto an old treadle base. I like to have a machine that can do embroidery, darning and button holes as well as the more common zig-zag stitches, etc.

A couple, friends of mine, wanted a 240 volt type sewing machine to run directly from 12 volts without needing an inverter.

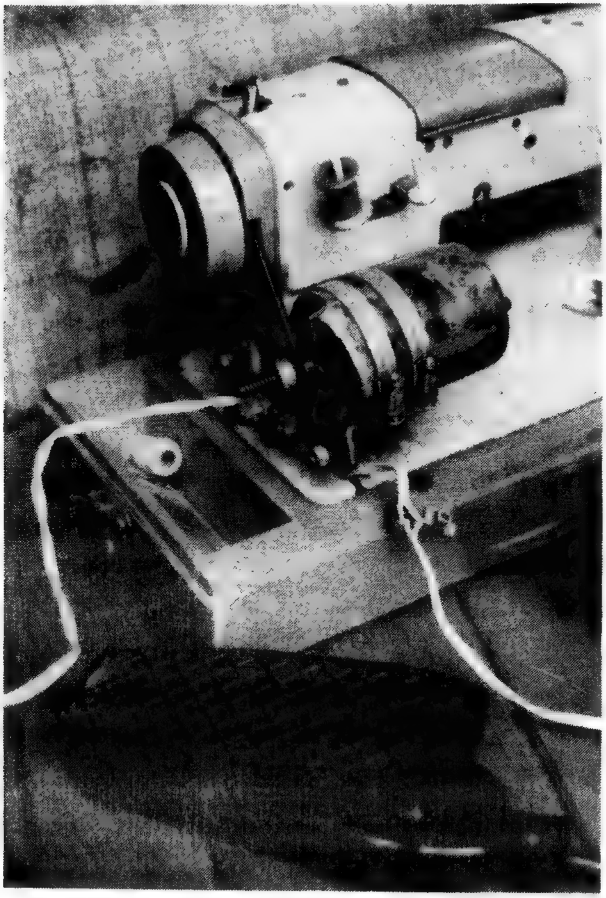
The type of conversion that I am about to describe cannot be done with the very modern sewing machines with internal motors and computerised controls. You need the type that has a motor bolted onto the back with a belt drive to connect it to the balance wheel of the machine.

If you have one of these machines, there are three areas that need to be changed to make it work directly from 12 volts:

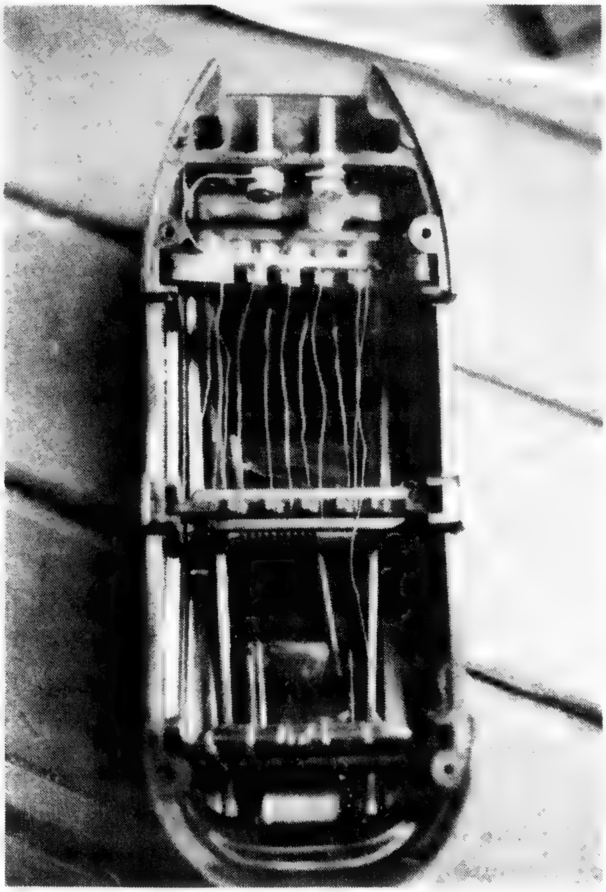
- The motor needs to be replaced by a suitable 12 V motor;
- The variable foot control needs to be rewired so that it has less electrical resistance; and
- The little 240 V light globe that shines down onto your work needs to be replaced with the same size 12 V light globe.

For the motor I used a car windscreen wiper motor, one that I think is common to **Ford, Holden** and **Valiant** and, possibly, many Japanese cars. I noticed that a lot of British cars have a quite different type of motor. The motor in question has a worm gear reduction taking the final drive to the windscreen wipers at almost right angles to the motor itself which is housed in a cylinder a littler shorter and fatter than a beer can.

I carefully dismantled the motor so that I could hacksaw off the worm gear housing without affecting the main motor housing or the central worm drive shaft, also making sure that the motor remained intact. The central shaft that comes out from the motor is the item that we are trying to expose and I must stress that it is important that it is not damaged at all during the conversion. The part that's not wanted is the gear reduction. When this job is completed you end up with a cylindrical motor with the shaft with the spiral worm drive sticking straight out of the end of it.



**Completed 12V sewing machine, showing car windscreen motor, worm drive shaft and belt.**



**A look at the wiring setup inside the foot control mechanism of the sewing machine.**

I found that the local sewing machine shop carried a variety of little pulley wheels that go onto the motor drive shaft. I selected the one I thought would be most suitable, but found that I had to drill it out slightly so that it would fit onto the windscreen wiper motor drive shaft.

Next I strapped two sturdy little right angle brackets onto the motor with two hose clamps of the right size. The free end of these brackets were then bolted onto the adjustable arm that originally held the 240 V motor in place.

There were three wires poking out of the motor so, with a little trial-and-error, I located the two wires and the correct polarity so that the motor would be turning at about the right speed and in the right direction. I then joined a length of figure-8 twin flex with the use of little screw terminals.

After measuring the length of wire required to connect to the sewing machine foot control, I cut only one of the two strands of the figure-8 twin flex at this point and bared 1.3cm (½ inch) of wire on both exposed ends which was then wired into the connector that plugs into the variable speed foot control. The other end of the twin flex is then wired into a plug to suit whatever socket is used on your 12 V setup.

The motor is now probably in a slightly different position to where the original 240 V motor used to be and I found that I needed to get a slightly longer drive belt than the original. If you plug it in and try it like this, you would find that it barely turns, if at all. This is because the resistance wire in the foot control is designed for 240 V and offers too much resistance in this case.

## Foot pedal

If you take out the screws that hold the foot control together and open it up, you find that it is actually a six speed control mechanism with six contacts that are made and broken in turn as you push down the pedal. All of these contacts are connected by one very long coiled resistance wire.

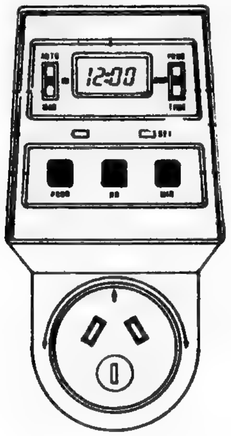
It may be possible to use the original resistance wire in a shortened version, but I decided to keep all the 240 V gear intact in case the machine ever needed to be reconverted. I bought some resistance wire (for 75 cents) from a **Dick Smith** store instead. I found that using a straight wire (instead of one twisted up like a spring) and only going half the length of the foot control (instead of the full length) did the job perfectly.

After having taken out the original 240 V resistance wire you would have noticed that it is one continuous length that connects to each of the six contacts in turn. The new, shortened version of resistance wire is connected to these contacts in the same way as the old one came out. Make sure that the wire between each two sets of contacts does not accidentally make contact with the wire between any other two contacts.

For the light, I connected a separate length of figure-8 twin flex wire with its own plug to minimise the effect of current surges caused by the motor on the light. You would otherwise need one extra strand anyway to bypass the foot control. For most sewing machine light fittings, I have found it possible to buy a 12 volt light globe with the same fitting and contacts and of about the same size and shape. I have done the same thing with the light for my 240 V to-treadle sewing machine conversion.

The folk for whom I did this 240-12 V sewing machine conversion have been using the machine for a couple of years now and they are convinced that it works better than it did originally on 240 V!

## 12 VOLT PROGRAMMABLE TIMER



In the electrical department of most large chain stores and supermarkets you may find a timer, used for turning 240 volt (V) lights and appliances on and off at preprogrammed times. I purchased a **Kambrook** model KD-36 **Plug-in Programmable Timer** for $20.00 (on special) with the conviction that it would be a simple matter to convert it to operate on 12 volts. Well it was!

If you undo the four screws in the back of the timer and open it up you will see two **printed circuit boards** (PCB) connected by a flat strip of multi-stranded colour coded connecting wire. The rear PCB (furtherest away from the display and controls) is held onto the rear cover by four screws which should also be undone. On this board you will find a 240V-to-12V transformer (the largest and heaviest object). This has two yellow and two black wires soldered onto the PCB. These wires should be unsoldered from the board, but remember exactly where they came from. The **capacitor** (a pillow-shaped brown object with two wires coming out of it) between the two black wires is also removed.

The metal tabs that hold the body of the transformer may carefully be prised off. If the tabs are able to come out through the slits in the PCB, then only glue and a thin layer of rubber holds it on. Once the transformer has been removed you connect each of the two positions from the spots where the black wires were removed to one of the two positions from which the yellow wires were removed. It does not matter which black position connects to which yellow position, but there must not be a wire that connects from one black position to another black position or from one yellow position to another yellow position.

The timer may now be reassembled and put to use.

For safety it is a good idea to put a label on the timer to the effect that it must now only be plugged into 12V. An alternative is to replace the 3-pin plug and socket with another plug and socket not used for 240V, but it would not be as easy to make such a neat job of it as with the original plug and socket.

**Solar tracker.** The timer has eight programmable times, four on and four off. I intend to use the four on positions with an adjustable **555** timing device to rotate my solar panel on an equatorial axis so as to have it roughly facing the sun throughout the day and thereby increasing the amount of electrical charge from the panel.

I have made a solar tracker previously using a **light activated switch** (LAS) under the advancing edge of the solar panel which caused the solar panel to rotate whenever the sun shone onto it. The solar panel stopped rotating as soon as the switch was again shaded. The problem with this system was that it would not work on an overcast morning, so that when the weather cleared up later in the day, the LAS would be exposed to the light from too much of an angle and remain in the morning position for the rest of the day.

With the proposed timing solar tracker I will still use an LAS to return the panel from the sunset position back to the sunrise position.

### 12 VOLT PLUGS

You can, of course, use the 240V 3-pin plugs and sockets for 12V electrical systems, but you must be sure that none of your 12V appliances ever gets plugged into a socket powered from a 240V source — **this could be deadly.** Plugging a 240V appliance straight into a 12V source could cause a short-circuit, which isn't so bad if your wiring is protected against short circuits with **fuses** or **circuit breakers.**

The active terminal (coloured red or brown) should be made your positive terminal. Either the neutral or earth, or both, can then be made into your negative terminal.

You can use both the neutral and earth terminals for two different voltages or two different purposes. For instance, if the negative terminal of the battery was connected to the neutral of the socket, you could then plug an **ammeter** (amp-meter) into one of your power points which would then measure the useage of any appliances connected to the earth.

Another idea is to have the neutral connected to your solar panel and the battery connected to the earth. If an ammeter is now connected between the two terminals it will read the amps flowing to the battery.

### A 12 VOLT CARAVAN

A caravan fitted for a dual power supply (240V and 12V) may be used entirely for 12V by fitting 12V light globes throughout and connecting the external 240V connector to the 12V battery according to one of the above wiring methods.

A standard dual power caravan has the negative of the 12V system and the earth of the 240V system both connected to the chassis of the van. Therefore only the positive of the 12V system needs to be connected to the battery as the earth of the 240V system is connected to the negative on the 12V system.

So by connecting an ammeter between the neutral and earth it would measure the useage of both wiring systems, except for the light sockets which previously carried the 240V globes. If these light fittings were to have the neutral wire disconnected and connected to the negative wire of the 12V system instead, then they would also be measured through the ammeter. This meter could then be plugged into any socket in the caravan to complete the circuit.

The alternative is to contact the negative of the battery to the chassis of the caravan and to disconnect the negative of the 12V lights and connect these to the neutral of the 240V lights instead. The ammeter still connects between the same pins on the power socket, but the current flows the other way and the active and neutral pins are used to connect the appliances. A volt meter can be connected into the same power point between the active and neutral to measure your variations in voltage.

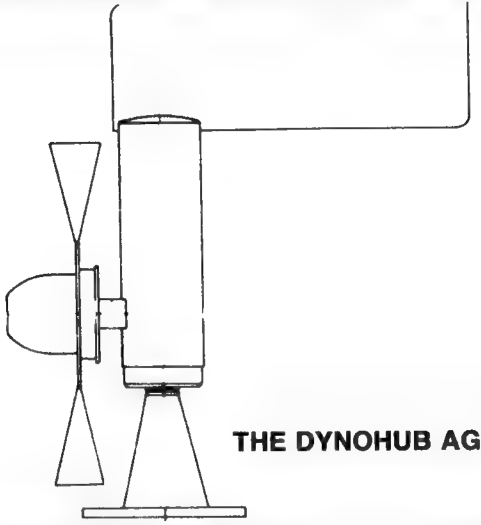
**Voltage adapter.** If you have any appliances that run on 3, 4, 5, 6, 7.5 or 9V, you can buy a voltage adapter that plugs into a cigarette lighter socket to power any of these, but make sure that the voltage adapter can handle the amps used by the appliance.

If you make up an adapter by wiring a cigarette lighter socket to a 3-pin plug, you can plug the adapter into any 3-pin power point.

**Note:** Due to the safety of handling 12V, anyone is legally permitted to do 12V wiring. The same is not true for 240V. In order to reconvert a caravan that has been modified for 12V back to 240V, it must legally be done by a licensed electrician.

**WARNING**

**You should clearly label all 12V power points and appliances, indicating that they are 12V, or to be used only with 12V. Do not make the wiring conversions covered in this article to a caravan that is likely to see a 240V power situation without being converted back.**



### THE DYNOHUB AGAIN

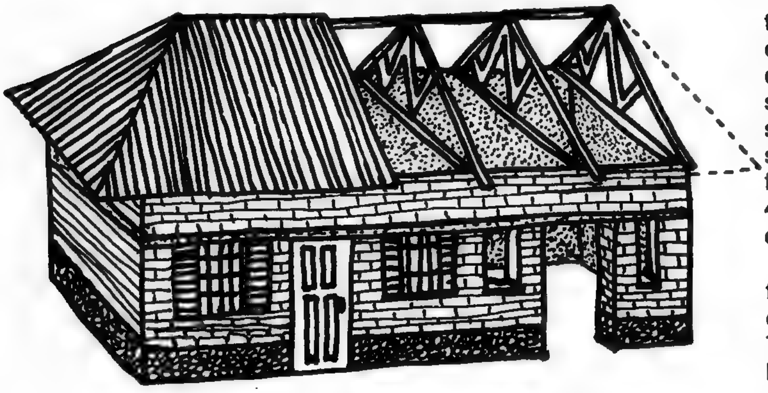
In his article **An electrifying tale** in **Earth Garden 44,** Greg Baker mentions having bought a little wind generator commonly used on yachts. He didn't mention the brand name, but did go on to say that the clamping ring broke in a storm, scattering the plastic blades.

It sounds like this is a **Selectromarine,** made in Poole, England. A friend of mine here in Nimbin had one and the same thing happened to his. He also tried to get the missing plastic pieces replaced and it was going to cost so much money everytime there was a storm that he decided to get rid of it. I ended up inheriting it as I was the only person interested in seeing what could be done with a broken plastic wind generator with missing propeller blades.

I ended up hacksawing the plastic hub apart as I was not interested in the plastic components and couldn't see an easier way to dismantle it. I was more interested in the generator itself. When I finally had the generator exposed, I was amazed to find that it was a **Sturmey Archer Dynohub** (bicycle dynamo). Nowhere in the literature did it mention that the machine was based on a bicycle dynamo, though it did state that it made use of an efficient multi-pole generator.

I had been building dynamo wind generators for a while and I was pleased to acquire another Dynohub to use. I scrapped all the plastic bits and pieces and spoked it into a bicycle wheel, using the wheel spokes to fix the blades made from aluminium printing plates (the spokes actually create the propeller shape) as described in **Earth Garden 39.** With bicycle front forks and head set assembly on which the whole unit rotates to face the wind, and with the tail vane bolted to the forks, I have an apparatus which generates electricity and won't blow to pieces in the next storm.

# The cyclone defensive house



Cyclone-defensive house taking shape.

By Dr Robert Rich

Hurricane, tornado, cyclone. Whatever you call it, it's a bit of a blow when it occurs (pun intended) and it is one of the most destructive natural forces you could wish to avoid.

Fortunately, cyclones only occur in certain places. They are born in the tropics, over the sea. They are eventually dispersed if they pass over land, especially mountains. So the best way to deal with cyclones is to hide from them. Local weather records should be consulted before you buy land in tropical or subtropical areas.

If you must live in a cyclone-prone area, you should at least learn about the dangers, select an appropriate building location, and build a house that is designed to withstand the expected forces a cyclone will throw at it.

Cyclones endanger a house in three ways:

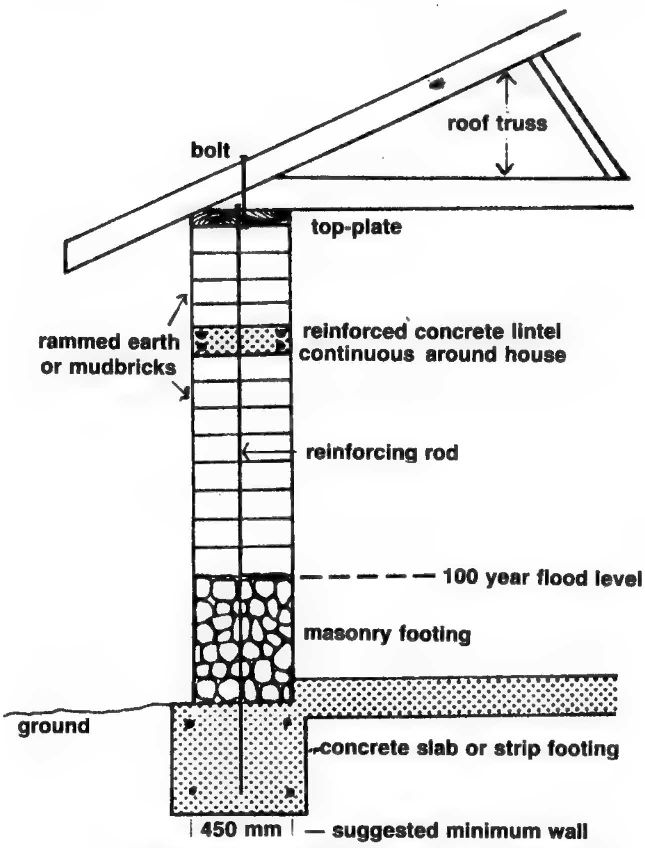
☐ First, the sheer power of the wind is unbelievable to people who have never experienced it. The main effect of this on a house is not so much a sideways push — although that in itself is very stong — but rather an uplift force: the roof is sucked upwards.

☐ Second, the wind picks up and whirls along a whole collecton of materials. Loose sheets of roofing iron can become particularly deadly missiles. Obviously, the outside envelope of the house should be solid enough to withstand battering by such objects.

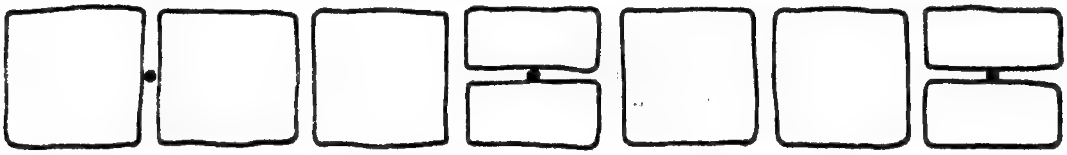
☐ Third, cyclones are often accompanied and followed by floods. This is usually due to the sudden, extremely high rainfall. But in coastal areas and tidal waterways there is a less frequent, but more serious danger. If the cyclone corresponds to a period of high tides, tide and wind action can combine to cause a tidal surge: floods of incredible height which sweep many miles inland.

From this it follows that if you wish to settle in a cyclone-prone area, you should choose land away from the coast (especially where it slopes gently inland) and out of the valleys of tidal waterways. Your house should be on an elevation high enough to be out of the way of flash floods, or it should be designed with floods in mind. The whole structure should be strong and massive. Masonry (brick, stone or concrete) is suitable. Earth walls are fine if stabilised against water penetration, or above the 100 year flood level (see **The flood defensive house,** Earth Garden 42). A weatherboard house is at risk as it could be demolished by wind-blown rubbish.

The whole structure, from footings to roof, should be tied together with vertical steel reinforcing rods (their diameter and spacing should be specified by an engineer). The rods should be set in the concrete footings, with the bottom end of each bent over and wired to the bottom layer of trench mesh. It may be convenient to place relatively short lengths, then weld extensions to them as the wall goes up. This is the only practical way to incorporate rods in a concrete brick wall. Stone or double brick walls can be


roof truss
bolt
top-plate
rammed earth or mudbricks
reinforced concrete lintel continuous around house
reinforcing rod
100 year flood level
masonry footing
ground
concrete slab or strip footing
450 mm — suggested minimum wall thickness

A cyclone-defensive earth wall.



A row of mudbricks in the wall (seen from above), showing position of reinforcing rods.

laid on either side of the reinforcement, with or without a cavity.

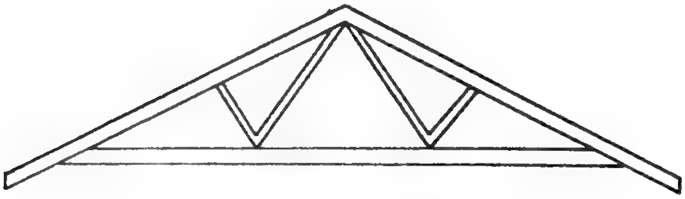
Rammed earth walls can be constructed with the rods going up the middle — they won't get in the way too much. If the walls are built of mudbrick, specially-made mudbricks will be needed to fit around the rods, because each rod will go through the middle of a brick at every second course laid. The best method is to make a number of "half-width' bricks and lay them as sown in the illustration. These bricks should actually be a bit thinner than half the wall thickness, to allow for mortar (and the rod) in the middle. For example, if wall thickness is 450 mm (it shouldn't be any thinner in a cyclone-prone area), and the rods are 8mm in diameter, the half-width bricks will be 220 mm wide.

An earth walled, cyclone resistant house should be designed so that all door and window openings go the same height. A reinforced concrete lintel should be made above this. It should be continuous around the whole house and made in a single pour. The earth walls may be continued above this lintel.

The tops of the vertical reinforcing rods should be threaded and passed through holes in a top-plate. The top-plate should be bolted down to the rods by this means. The roof structure should be attached to the top-plate with bolts. In this way, the roof is securely tied down to the footings.

Roof shape and slope are important. The best shape is a hip roof with a minimum of projections and discontinuities. Slope should be about 30°. The flatter a roof, the more suction is produced by wind passing over it. Building a flat roofed house in a high wind area is asking to play kites on a grand scale.

The conventional method of roof construction involves rafters and a ridge beam. The major alternative is to make up a roof structure out of trusses. A roof truss is an engineered, pre-assembled structure which acts under load as if it were a single, gigantic piece of wood. CSIRO research has shown that a truss roof resists wind forces much better than a conventional roof. Cyclone Tracy in Darwin dismembered many conventional roofs. Truss roofs stayed intact, even if the wind lifted them off and dropped them beside the house!



**A typical roof truss (W-type).**

Roof cladding should be properly secured. Tiles must be wired on (every one of them), while metal should be secured with screws or a patent cyclone proof system. Power and telephone lines should be underground, but protected from water penetration. Finally, all doors and windows should be equipped with effective storm shutters.

Don't be afraid of building your own home, even if you are in a cyclone-prone area. If you build it yourself, you can be sure it is built to your standards. At least there will be nobody else to blame if it doesn't stand up to the next cyclone.

# Mudbricks

**By David MacMunn**

Well here we are at the stage which makes all the muddy clothes and stiff backs worthwhile. For the achievers among you, laying mudbricks provides a great degree of satisfaction at day's end. The bricks are big, so they fill in a wall quickly and given that the rustic look is accepting of faults, deviations from exactly uniform walls can be forgiven.

Nevertheless, cumulative error can rear its ugly head, so you can't afford to let things get too sloppy. In **Mudbrick methods (Earth Garden 44),** I emphasised that the method I talked about was not the be-all-and-end-all. It worked for us. This also applies to aspects of mudbrick laying. Develop your own methods, but be open to suggestions for change.

We now have our mudbricks piled up near the walls under construction and we're ready to go. Having lifted mudbricks around the house site I was happy that we had made strong concrete foundations strengthened by reinforcing rod.

The main **tools** we used were a wheelbarrow for moving the mortar to the walls, string lines, plumb bob, a shovel and those excellent utensils at the end of your arms. We'd tried trowels for spreading mortar, but broke two and found our hands were better anyway (as long as you didn't try to turn off the hose with hands still muddy and greasy!).

Our **mortar** was mixed up in our bath using roughly half-and-half loam and clayey soil. The loam was sifted through a single bed spring base which fitted neatly over the bath. The clay wasn't sifted, simply because it was generally damp and so defied sifting. Obviously, no straw

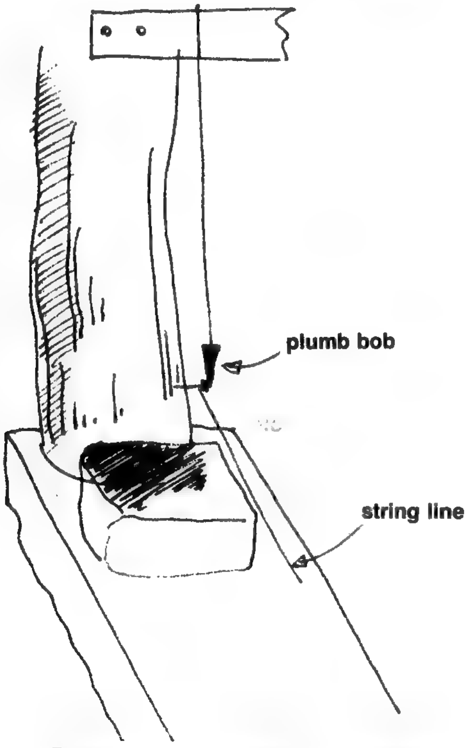


**Diagram 1 — plumbing infill walls.**

# become walls

was added and the mixture was made wetter than for making mudbricks. Experience showed just how the mortar mix should look and feel and we found that it benefited from being mixed the night before and sitting overnight until needed.

Our construction required that we lay both load-bearing and non-load-bearing infill walls (what technical terminology!), so I'll mention our escapades with both types.

**Infill walls.** Most of our walls were made to fill in between embedded timber poles. Our footings were about 12 inches wide, which fitted in well with the 12 in wide dampcourse we used and our 10 in mudbricks.

For infill laying we usd a string line stretched between nails embedded in the flanking poles to keep the walls straight. The first nail positions were levelled by a water line set to position on the footing and the graduations could be made up the poles (making allowance for mortar as well as brick height).

Now ready, set, go! Mortar was applied on top of the dampcourse and the first course of mudbricks was laid. The bricks to be laid were arranged, flat, near the wall and dampened. As the bricks were laid the edges in the wall (10 inch side) were coated with mortar and the next brick laid and pushed up against the previous bricks and into the mortar bed. On this bottom course, at every second brick I used a wooden spacer instead of mortar, to assist sub-floor ventilation (the spacers were later extracted).

To keep the wall continually vertical we nailed cleats to each pole well above the brickwork. From the first course string line position, we plumbed upwards to the cleat and marked this on the cleat. After that whenever the string line was moved to each new course its position could be checked by plumbing down from the cleats as shown in Diagram 1

Invariably the bricks did not fit exactly between the poles so they had to be cut. Mudbricks are tolerant little entities. We found the best method for cutting bricks to size was to measure the length required (excluding mortar) and to mark it on the brick. For a while we used a machete and a club hammer, placing the brick flat on a scrap piece of 10 × 2 timber, but cutting on the line produced a few failures and many swear words. In the end we used to place the brick on the timber and used the machete to gnaw away at the brick from both edges until the required length was reached.

From that point, laying was a repeat process. Because I wanted the brick profile to stand out, we scraped the mortar back with our fingers (I think the term is pointing) as in normal brickwork.

**Load-bearing walls.** When it came to our extension (and the house wasn't even finished!), we decided on load-bearing mudbrick walls. Our extension was 4m × 2m, with the 2m walls extending out from the embedded poles.

To maintain the line of the walls and to keep them vertical, we first of all used plumbed stakes. Where the walls hit the poles we could use nails in the poles. This was fine to just above floor level, which then allowed us to lay piers and sub-flooring and to butt the flooring into the partial walls.

Then back to the mudbricks, but we needed a new method for guiding the walls. We ended up using classic bricklaying practice. We would lay the corners to two courses above completed height (three bricks) then, after checking their level and plumb, stringline between them. The 2m walls we stringlined from the corner to nails in the poles, as in our infill laying method.

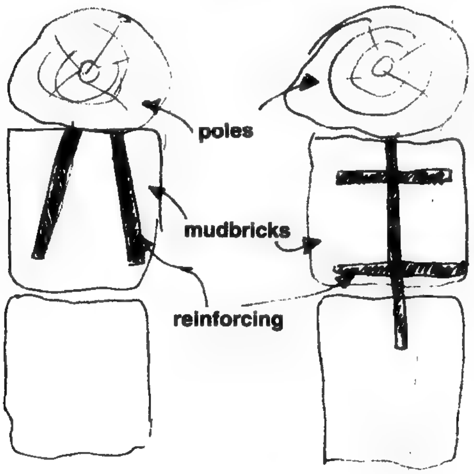
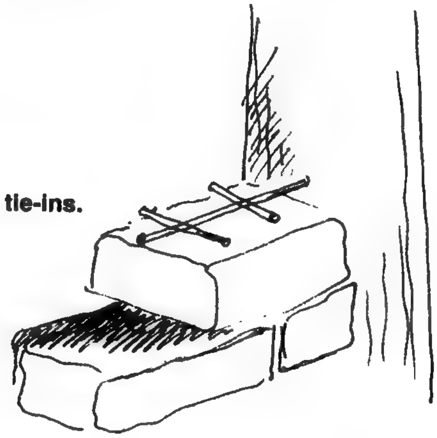
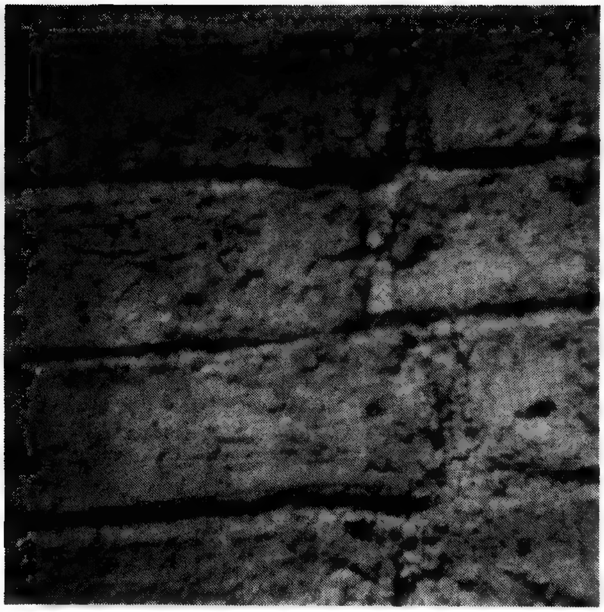


**Diagram 2 — mesh and bar tie-ins.**





**Mudbrick walls before finishing.**

On the loadbearing walls we needed a top-plate above the 4m wall for attaching rafters. When we were two courses from the final height we decided on the position for fixing and drilled holes in the three bricks with a masonry bit. We used ½ inch galvanised cup head bolts and as an added washer-cum-fixing-method, I cut a piece of galvanised iron about 4 in × 4 in, cold-chiselled the centre to fit over the square shoulders below the bolt cup head and bent up each corner. This helped stop the bolts from swivelling. These bolts were laid in the second last course and the last course was laid with bricks flanking the bolt so no drilling was required.

**Reinforcing.** I should now mention the necessary aspect of wall reinforcing, especially as it was something which changed somewhat as we went along. In our early days of infill laying we used 6 inch wide brickies' mesh every three or four courses, stretched and secured at each pole. I had read that barbed wire could be used for reinforcing, so I had already collected some fencing rejects ready for my mudbrick walls. I tried it once and only once. An utter waste of time. It took me ages to rescue a piece long enough to use from the tangled heap I had so eagerly collected. Being high tensile wire it was difficult to bend to secure against the poles and difficult to tighten along the brick course. I shouldn't have stopped its journey to the tip

We also used sections of F18 mesh cut into a TV aerial sort of shape with the main length banged into the poles and sitting flat on the brick course. This seemed better.

Later, when visited by a person with extensive mudbricking experience, we found an even better method. What we did was to reject barbed wire and mesh and simply bang two lengths of 10-15 mm bar into the poles so they splayed out flat along the brick course every three to four courses. Even though we were nearing the end by this stage, we adopted this method (see **Diagram 2**).

To tie in windows we used rod driven into the pre-assembled frame. Before that we had used brickies' mesh between the frame and the pole. In the corners of our extension, where there were no poles, I was concerned about the corner bonding, so to assist I used right-angle sections of 8 inch square mesh, which extended about 18 ins down each wall. These were used every three courses.

**Walls after bagging and sealing**

**Finishing.** Just when you've almost finished, along comes another slow but necessary process (necessary if you don't want continual mudwall dandruff on the floor). To finish the walls we first brushed them down using a wire brush. A mortar mix was applied with our hands and sections of hessian bag and then the process was repeated before the section of wall dried. We added only the minimum of extra mud to fill in cracks (because the added mud tends to crack as well).

We did this normally about five times, the last time using a watered-down mortar mix with water on hand. After the watered-down mortar had been applied with bags where needed, the wall was wet-bagged and ready for final sealing. For sealing we used a mixture of **Bondcrete** and water, 1:10 with a bit of muddy water included to reduce the gloss which made early walls look like plastic.

As with most other building jobs, mudbrick laying and finishing is a good two-person job. In our job I tended to do the heavy work of mixing mortar and moving bricks and cutting them when required and Kerry did the actual laying of the walls. The system tended to work well — and so did the wall, thank goodness!

## EARTH BUILDING FORUM

**It is with regret that we advise that the voluntary, non-pofit group Earth Building Forum** has had to cease operations due to administrative difficulties.

Despite growing interest in earth wall building, assistance and input by members diminished to a point where day-to-day activities, even at a minimal level, became a difficult problem.

The issue was considered by Forum members at a general meeting in June 1984, but it unfortunately failed to satisfactorily resolve the matter.

We appreciate the concern shown by people about our situation, but feel that in view of the circumstances we had no other option but to wind up activities.

We wish to sincerely thank all those who assisted the Forum with its open days, exhibitions and other promotions and ask that they might continue to promote earth building in the future.

**Ian Factor and Bob Young**

# Supermarket survival

You have to be a super shopper to shop at supermarkets. There are good buys and bad buys, but there are food buying skills and strategies which you can learn.

Most Australians shop at large supermarkets. We leave our cars in the big parking lot, push our trolleys down the aisles and serve ourselves, paying $7,000 million for our processed foods at the checkouts each year.

This mass distribution of foodstuffs, based on the American model, has brought us the benefits of large turnover which puts good quality foodstuffs at good prices on supermarket shelves.

With such a variety of food under one roof, the supermarket may be either a cornucopia of plenty, or a Pandora's box full of evils. In the game of wits played between manufacturers and consumers, the choice, in the end, is up to us.

On the one hand, the supermarket, more than anywhere else, is filled with highly processed foods (and some non-foods) which have been treated with chemical additives, preservatives, artificial colouring and flavouring, stabilisers, thickeners, emulsifying agents, added sugar or other sweeteners, salt and monosodium glutamate (MSG).

The aim is food which has a long shelf-life in attractive packaging, backed by advertising campaigns and television promotion. The foods probably taste good too, but that is not the first consideration.

On the other hand, if you know which foods to select and have some idea of nutritonal values, you should be able to buy good quality foods at a fair price, sometimes even at sales prices. Supermarket chains have buying power and there are often genuine bargains and specials if you compare prices from one outlet to another and one brand to another.

The first rule of thumb is **always to read the label.** Buy the product, not the colourful picture on the label of the packet or can. It's what's inside that counts. Compare the weight and the price with other brands and find out where the product comes from and the last date it should be eaten. Don't pay extra for 'convenience' such as added sauces or flavourings, sliced or 'ready to serve' foods.

Keenly priced so-called 'generic' house brand or 'no label' goods are often identical to more expensive brands. The cost of the television ad to make you buy the product, or more of it, has not been added to them.

In general it is better to buy unpackaged products first, fresh food before frozen, dried foods rather than canned, fresh fruit and vegetables in preference to canned fruit, vegetables and juices.

**Plan your meals** before shopping, based on the foods in season and any specials that you know about. Write down what you need, take the list with you and try to stick to it. Avoid impulse buying of gourmet foods or other expensive items you think you'd like to try.

For your health, you should try to cut down on ice cream, foods with added sugar, cigarettes, soft drinks and packets of lollies which are displayed near the cash register.

Supermarkets are businesses. As the trend to eat less processed foods has become apparent, stores are beginning to introduce health food sections. Pre-mixed muesli now accounts for 20 per cent of sales of breakfast cereals (but it is still probably cheaper to mix your own muesli) while sales of natural (unflavoured) yoghurt were $40 million in Australia in 1982.

### COMPLAIN

We Australians don't complain enough, ask for what we want or explain why. Unless the shopkeeper is aware of your feelings, he can't cater to them and give you good service. We have to demand healthy, fresh foods and learn not to accept rubbish. The manager probably believes the stuff on his shelves is good for you and eats it himself. Educate him, then write to let the manufacturer know what you think about his product.

We think beans, sold in bulk, are the best supermarket bargain today. Many stores now have loose, unpackaged dried peas and beans, lentils and nuts. You serve yourself from bins or bulk containers, so you can see what you are buying and judge the quality easily.

These staple legumes are a good source of protein. Especially good value are black-eyed peas (cowpeas), chickpeas (garbanzo beans), lentils, soybeans, lima beans, split peas, kidney beans, pinto beans and whole peas. These may be sprouted after washing, or prepared in dozens of no-meat meals. Canned beans are at least double the price.

Some types of tinned food are good value. Fish, for **example**, tuna and sardines, provides good protein and vitamins. Buy several tins when prices are low and store them in the pantry. Buy for your intended use and, usually, around middle price. There is little meat in some tinned meat mixtures. Irish stew often has more potatoes than meat. Again, read the label.

Always wash fruit and vegetables throughly when you get home to remove chemical spray residues, but peel them shallowly because the best nutrients are just under the skin. Make your own fruit juices from fresh fruit. As you walk through the supermarket, think about which products you might be able to process yourself at home, for example, bread, yoghurt, salad dressings and bean sprouts.

Many processed foods are high in calories but low in nourishment. We've grown up with white bread and sugar and potatoes, the legacy of depression and war. We have locked-in taste preferences, but we must be prepared to learn more and change our buying and eating habits for our health and our financial well-being.

To eat cheaply from the supermarket requires a degree of consumer sophistication, time to plan and cook the food properly, a willingness to experiment and the ingenuity to make the cheap food tasty — turning **yuk** to **yummy!**

**This extract is reprinted from our recently published HARD TIMES HANDBOOK.** Mail order form, page 58.

# HOMEMADE SUNTAN LOTION

By Kez van Oudheusden

Loving the surf and the sun as I do and not liking the prices I was paying for suntan lotions, I did a few experiments and came up with a protective, yet tanning oil, which costs very little. The coconut essence gives it a wonderful smell and the oil of citronella keeps the flies away. I have a medium complexion and can burn if I'm not careful. So far this summer, I'm browner than I've ever been and that's without deliberate sunbaking! I would appreciate hearing from anyone with other recipes.

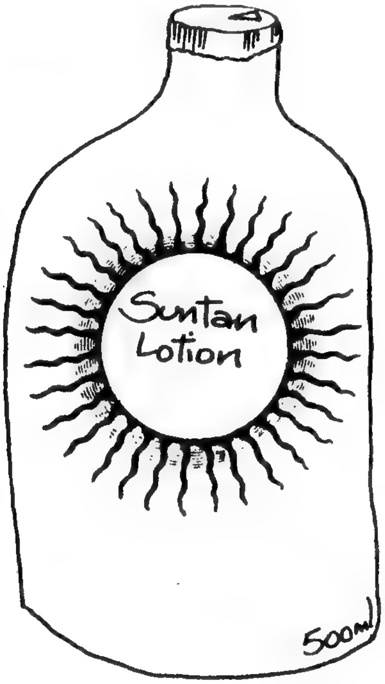
....enough to last a whole summer & give a really good tan & protection... for medium to olive skin

You will need:

a. Olive oil (..from supermarket, about $4)
b. Oil of Citronella (chemist)
c. Any body moisturizing lotion.
d. Coconut essence (most supermarkets)
e. Cocoa (the stuff you drink.)

Heat ½ cup olive oil & dissolve 1 tspn cocoa within!.... In large squeezable bottle, fill ⅓ with body lotion, add few drops of oil of citronella & coconut essence. Then add heated oil with cocoa & add enough olive oil to almost fill bottle. Shake well & apply liberally.

You can alter the consistency by adding more or less body lotion or oil, & colour protection by more or less cocoa.

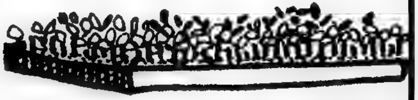


## HIPPOCRATES HEALTH CENTER

An Hippocrates Health Center has opened at Mudgeeraba on the Gold Coast of south-east Queensland.

Modelled along the lines of Ann Wigmore's Hippocrates Health Institute in Boston, Massachusetts, USA, the Center will feature organic sprouts and wheatgrass growing, raw food diet, body cleansing, nutritional counselling and a chemical-free environment.

Elaine Hollingsworth is the director of the new Center. She is seeking experienced staff for both outdoor organic farming and indoor sprout growing positions. Apply to PO Box 12, Mermaid Beach, Qld, 4218. Phone: (075) 30 2939.



access

## OF PEOPLE AND PLANTS

Video film, 22 minutes, available in ½ inch or ¾ inch VHS or Beta format, $65 for individuals, $55 for pensioners (plus postage). Order forms from People and Plants Association of Australia, PO Box 558, Subiaco, WA, 6008.

This video shows various people with disabilities, as well as elderly people, gardening, with examples of 'how to do it with a disability'.

Membership of the PPAA (formerly Disabled Gardeners' Association of Australia) is $5.00 annually from the same address. The group has a 'library' of long-handled tools (and one of books and magazines), with quarterly meetings and a newsletter for members.

## BOOKS BY MAIL

A catalogue of 'books for people on the land' which are available by mail will be sent to you free if you write to Technical Book and Magazine Co Pty Ltd, 289-299 Swanston Street, Melbourne, Victoria, 3000.

Book titles are listed under such topics as animal nutrition, beekeeping, country kitchen, dairy farming, deer farming, dogs, farm buildings, farm machinery and shopwork, farm crops, forestry, fruit and vegetables, gardening, goat keeping, home computers, horses, insect pests, irrigation, livestock, pig keeping, poultry, self-sufficiency and veterinary.

## EUCALYPTUS OIL

$15.00 per litre packed, plus postage (weight 1.2 kg), from Thompson & Thompson, 99 March Road, Orange, NSW, 2800.

Eucalpytus oil is now produced entirely from plantation-grown blue mallee *(Eucalyptus polybractea)* leaves which are mechanically harvested.

The oil is used for medicine (colds and chilblains), washing, disinfectant, invigorating saunas, as deodoriser and massage oil and for eucalyptus candles (see *EG8*).

## ALMANAC 2000

*1985 Calendar*

John Knapen, 36 pages, paperback, illustrated. Price $2.00 per copy posted from Almanac 2000, Gordon Road, Koonorigan, NSW, 2480.

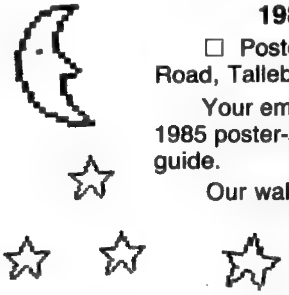
*This year's Almanac 2000 calendar still has a vegie planner for sub-tropical climates, with sowing charts and notes on what to plant and when. It is interestingly different because it is based on the siderial zodiac as against the traditional moving zodiac most astrologers use. It is laid out in lunar months to help you get into the rhythms of nature and plants.*

*Maggie's Farm*

## 1985 HOPE CALENDAR

Poster-sized calendar, 60 cm × 120 cm, black or burgundy. Price $6.00, plus $1.00 post & packing, from Maggie's Farm, PO Box 29, Bellingen, NSW, 2454.

The Hope Calendar is different. It features 365 boxes with graphics and facts which are all 'good things' to remember each day. No wars, no deaths but births of artists, writers, poets, musicians, inventors. Lots of weird facts to bring some hope into your life.



## 1985 ASTROLOGICAL CALENDAR

☐ Poster, $3.00 per copy, from Thomas, Mt Cougal Road, Tallebudgera Valley, Qld, 4228.

Your empty wall space is waiting for Thomas' colourful 1985 poster-sized astrological Calendar and moon planting guide.

Our wall has no blank space, now.

## GREEN BAN

Green Ban is a new label you will run across in health food shops. It covers a range of 'herbal alternatives' to chemical garden insecticides, chemical insect repellents and flea powder for animals. All the products use natural herbs, are highly aromatic and are made by Mulgum Hollow Farm of South Lismore, NSW.

# BATTERY PROBLEMS

**Batteries are often a bugbear for people who run their homes on low voltage electricty. This is probably because they are the *backbone* of independent energy systems and essential for the storage of power generated by solar cells and wind and micro-hydro generators.**

**Peter van der Wyk has these comments on battery problems encountered by contributors to *Plug in the sun* (Earth Garden 44).**

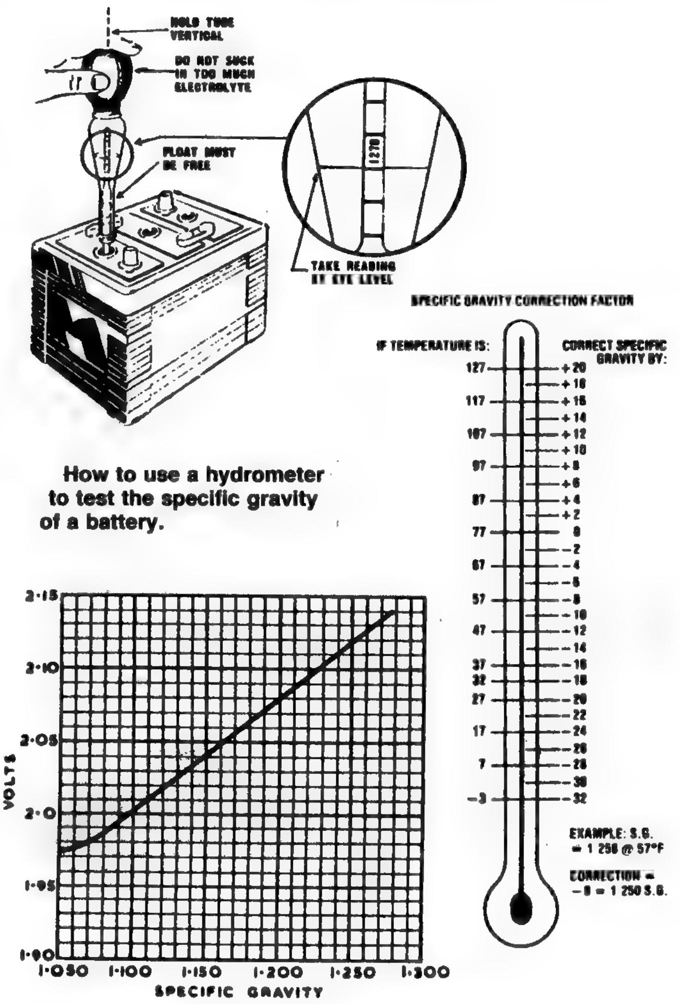
## Feedback from Peter Pedals

### Battery gassing

Greg Baker, in **An electrifying tale,** talks on pages 22 and 23 about achieving a gassing voltage. Whereas the voltage of a fully charged cell at rest (neither charging nor discharging) settles down to 2.1 volts per cell, the gassing voltage or float voltage, is the voltage where a steady stream of very tiny bubbles is continuously coming to the surface (2.15 to 2.3V per cell at 25°C).

You may find the occasional large bubble coming up from the bottom of the plates. If you look closely you may find that this is just accummulation of the small bubbles that were formed underneath the plates and came to the surface all at once. If, on the other hand, there are large bubbles coming to the surface continuously and the voltage at the battery terminals reads over 2.35V per cell, the battery is above gassing voltage and is said to be boiling. Under these conditions the battery may start to get warm or even hot and the electrolyte is breaking down to release hydrogen and oxygen, thus steadily reducing the electrolyte. **Whereas a gassing voltage may be maintained for as long as you like, you must not allow it to boil too often as it will damage the battery.**

By achieving a float charge (at gassing voltage) at regular intervals, the electrolyte will be stirred up to prevent stratification. An equalising charge of 2.35v per cell may be applied to the batteries once every few months to bring some of the more sluggish cells in the battery bank to a level equal to the other cells.



**How to use a hydrometer to test the specific gravity of a battery.**

### Battery sulphation

You should also set a limit as to how low the voltage and specific gravity should be allowed to go. Chris Martin discusses sulphation in **Energy off the Shelf** on page 27. Sulphation is a condition that may occur when batteries are left in a discharged or semi-discharged state for considerable periods of time. Sulphation will cause the battery capacity to be reduced and all lead-acid batteries are prone to this, whether they are true deep-cycle, or starting-lighting-ignition (SLI) vehicle batteries. The sulphate from the sulphuric acid forms a compound of lead-sulphate which hardens on the negative plates. If this situation is not corrected quickly the lead sulphate will become increasingly harder and more crystalline in composition and more difficult to be broken down by charging. As the sulphation progresses the lead-sulphate also expands and buckles the plates which in turn can cause short circuits in the cells.

A partly sulphated battery can be brought back into service by slowly charging and discharging it a number of times. In the process the battery must not exceed 69°C for more than ½ hour. Fast charging a battery in a badly sulphated condition would probably ruin the battery. Superficial sulphation can be totally cured with a series of very slow charges and shallow discharges over a period of 15 to 30 days.

### Deep cycle batteries

On page 17 where **Basic terms and concepts** are explained and again in the article **Six panels or $35,000?** by Harry Weller on page 25 it is stated that deep cycle batteries can be discharged completely (deeply) hundreds of times.

This may be true, but it is not advisable. When people come across this information without an accompanying warning they often end up abusing their battery thinking they are doing an acceptable thing. Battery abuse from an unthinking acceptance of this half truth is common. Considering that there are only 365 days in a year, it may turn out to be more expensive than being connected to the electricity grid. The ideal situation is to have the batteries on a float charge almost continuously, but otherwise the batteries (whether or not they are deep cycle batteries) should not be allowed to discharge too much.

On page 23, Greg Baker suggests not letting the batteries be discharged by more than 50%. The less the battery is allowed to discharge the better.

With the **Century** batteries with the built-in hydrometer of three coloured balls, the whites go down when discharge exceeds 15%, the greens go down when discharge exceeds 50% and the reds go down on almost 100% discharge.

If you can manage it, I suggest you should operate on the whites only, thus keeping the cells at above 2V per cell (2.05V per cell represents 20% discharge). The voltages I am describing here are of the battery at rest (as opposed to charging voltages). All voltages must be taken at the battery terminals with good clean contacts. The voltage of the battery at rest must be taken when there is no charge and no discharge occurring and the battery has been left to rest for 20 minutes or more. When the green balls have gone down your voltage would read below 2V per cell. Remember that allowing the battery to remain in a semi-discharged state for a length of time will cause the sulphation process to begin.

Also I must warn against putting a new battery in parallel with an older used battery, or putting two significantly different batteries side-by-side with common postive and negative connections. If one battery is capable of achieving a higher voltage than the other, the battery that cannot maintain that voltage will continuously prevent the other from maintaining its true potential. As suggested by Chris Martin on page 28, the difference in amp hour (Ah) capacity has nothing to do with whether batteries are matched or not, it is the potential difference in voltages that we are more concerned with.

Going back to Greg Baker's article. He also suggests that with his Century battery bank he can get 6V from three cells, about 9V from four cells and 12V from all six cells. It is not advisable, however, to be charging and using the entire bank as one unit and then also to be discharging only portions of the battery bank. If you notice that there are, let us say, three balls in three adjoining cells going up before the others and staying up longer than the others, you can help to equalise the battery bank by connecting a 6V appliance across these three cells. But rather than depending on the battery bank not being equalised I would recommended to have a few cigarette lighter sockets around the house so that you can buy one or more cigarette lighter socket adapters to give you a choice of 3, 4, 5, 6, 7.5 or 9V. But make sure that the amp rating on the adapter is more than the amp rating of the appliance that you wish to plug into it.

### Washing machines

In my article on **Low voltage appliances** on page 43 of EG44, I mentioned that a 6 volt generator might be suitable as a 12 volt motor. I am guilty here of suggesting something without having tried it. My friend (the local whizz) assures me that there is virtually no difference between 6V and 12V generators and that you would need more than 24V in order to get anything like enough revs and torque out of it.

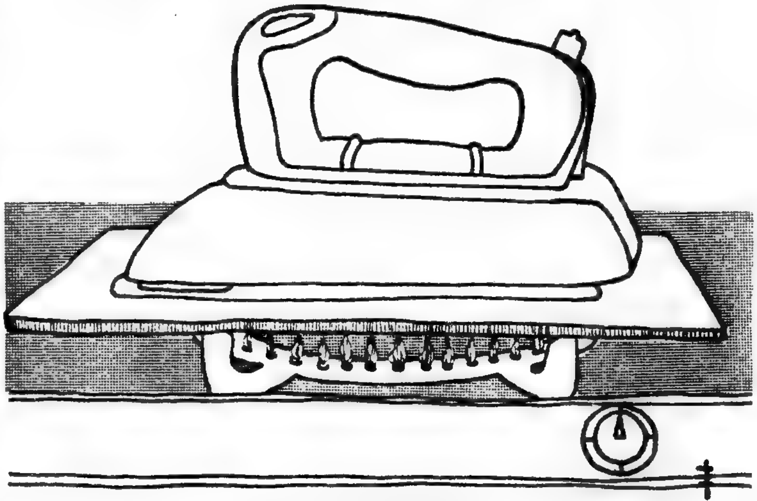
Ideally, you should rebuild the generator, as suggested by my friend Lindsay Corben in the article on page 44 of the same issue.

### Refrigerators

In my reply to Jeanette Hutchinson, I didn't answer the query on converting 240V refrigerators.

With modern fridges, unfortunately, the compressor motor and compressor are inside a sealed unit and virtually impossible to separate from one another. However, I have been told that in the older 240V fridges the motor was separate to the compressor and was often connected to it by a belt. In such a set-up it would be a simple matter to replace the 240V motor with a 12V motor, or even a small Pelton Wheel. If I had such a fridge, I would be tempted to experiment with it.

# Pressing matters



### By Lisa Corben

I was interested to read in **Earth Garden** about others having problems with ironing. The one thing I missed with our solar electric system. (See: **Homemade Power** and **Alternative washdays** in EG44) was my steam iron, particularly for pressing seams when sewing.

My problems have now been solved, so I would like to make some suggestions which may help people. First, cut down on your ironing. Don't iron anything that it's not absolutely necessary to press. I knew someone once who ironed practically everything, even socks, towels and underclothes. What a waste of energy!

**Shellite-type irons** (EG44, page 42) are hot and heavy and you can be a nervous wreck by the time one is functioning properly.

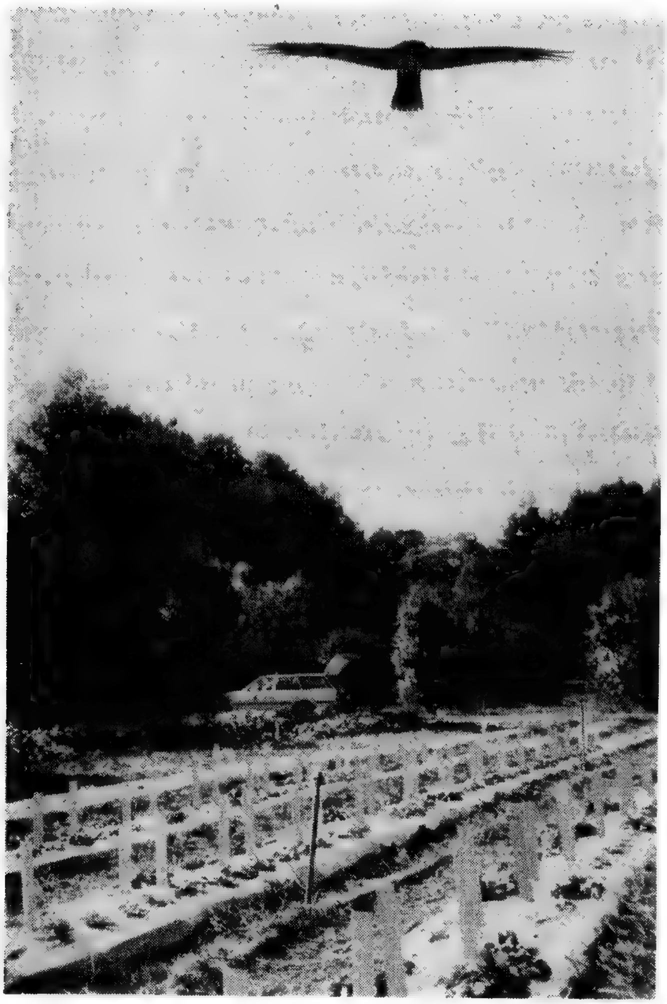
**Cast irons** are also heavy and hot (you need a potholder to handle them), slow to heat and rust easily, which means a lot of maintenance. They are quite expensive to buy as they are now considered to be antiques. Of course, you may have one in the family which you'd like to use, in which case a piece of lambswool sewn around the handle helps.

**A pre-steam 240V iron** with the electric cord removed is ideal (I purchased one for $6 in a secondhand shop). In winter I heat the iron on the pot belly stove. In summer I put a steel plate over the gas flame and heat it on this. The plate heats while I am using the iron, so there is no need to turn down the gas. The handle of the iron is prevented from getting hot this way.

If you use a fine spray on your clothes, or wipe a wet cloth over them before pressing, you have the same effect as a steam iron. Press over the damp cloth for woollens and press very lightly over (on the wrong side) for velveteen, etc. Silk-based velvet can be pressed by putting the damp cloth over the iron and drawing the wrong side of the garment over the damp cloth. This steams and lightly presses.

You can damp all your clothes down on Tuesday morning and iron on Tuesday afternoon as my Grandma did (washday was on Monday), but that's making a **really** big deal out of it!

# Big Bird keeps little birds away



Birds are often a serious pest to fruit tree crops, blueberries, strawberries, grapes, grains, oilseeds and other commercial crops.

Now there's a 'big bird' which is proving to be effective at keeping the little birds at bay without harming either the birds or the environment.

It's a life-like and life-sized model of a hawk, called the **Wonder Bird Scarer.**

Moulded from tough plastic, it has a 750 mm wingspan tipped with imitation feathers which move with the slightest breeze to resemble the natural flight of a hawk hovering over its prey. This effect is achieved by suspending the device from three lines of 25 kg or stronger fishing line stretched between trees or poles over the area to be protected.

"Birds that are a natural prey or that have an inherent fear of hawks will not fly, land, feed or roost within sight of the profile of the hovering hawk," says Trevor Richards of Tisara (Australia) which markets the Wonder Bird Scarer.

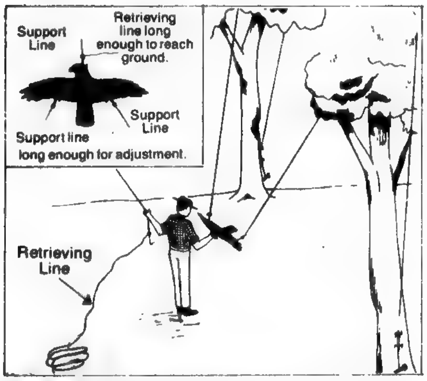
It was invented by boat builder John Lindsay to keep seagulls off yachts on Sydney Harbour. Encouraged, he gave several of the hawk models to fellow members of the Blueberry Growers' Association, who picked crops free of bird damage for the first time in years. As each Wonder Bird Scarer was positioned over the berries, silvereyes, sparrows, starlings, noisy minors and parrots all fled in fear.

The scarer has been tested by several NSW Department of Agriculture officers. Peter Millthorpe, Research Agronomist (oilseeds) reports, "It has stopped all the parrot family from destroying our oil seed trials". Ruhi Sarooshi, Senior Research Horticulturist of Narara Research Station says, "I am very surprised and encouraged about its effectiveness in controlling a wide range of birds from eating out strawberry and blueberry crops".

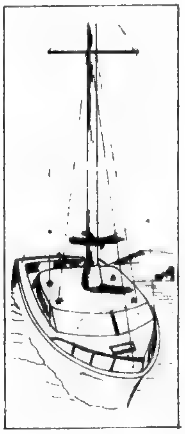
The 'big bird' can be put in position when food crops need protection and removed after harvesting when the natural bird population will return to the area. It seems preferable to such methods as pesticides, nets and noise-makers — or trapping and shooting (which are illegal in Australia). The 'hawks' are produced in Sydney by the NSW Spastic Society.

**Warning:** Keep away from poultry or small pets. Day-old chicks straight from the egg have dropped dead from fright at the sight of the hawk shape.

The Melbourne Transport Authority is using them to keep pigeons out of its tram sheds. Other suggested uses include protecting new lawns, vegetable gardens, TV antennae, fish ponds, glasshouses, swimming pools from ducks and bowling greens from cockatoos and galahs.


Support Line
Retrieving line long enough to reach ground.
Support Line
Support line long enough for adjustment.
Retrieving Line

Make up hooks (coat hanger wire or similar). Tie the other end of fishing line to hook. Connect 3 hooked lines to hawk. Tie retrieving line to one hook, long enough to reach ground when hawk erected.



☐**The Wonder Bird Scarer**
Price $14.95, plus $2.00 post & packing,
from Tisara (Australia) Pty Ltd
PO Box 36, Morpeth, NSW, 2321

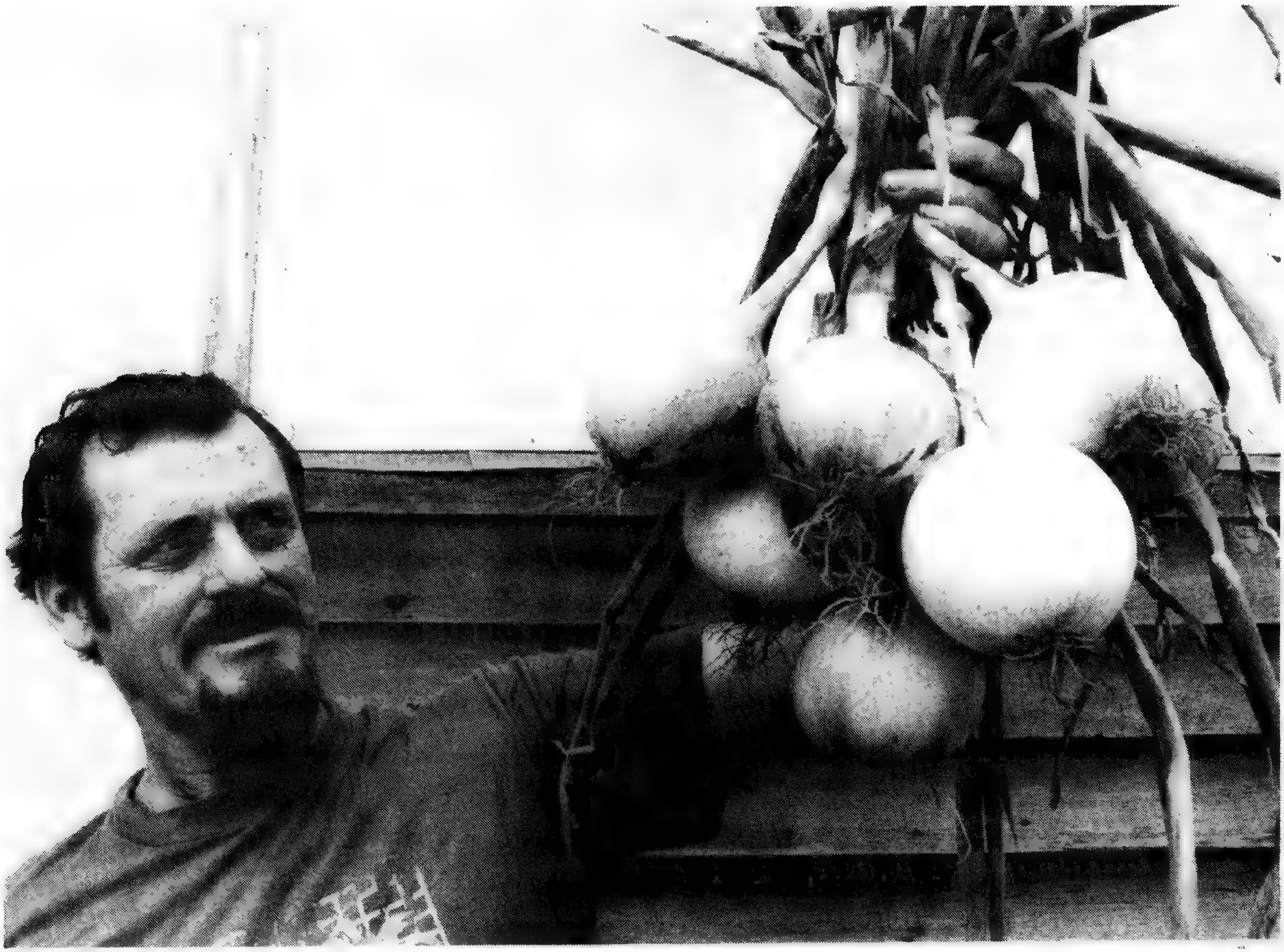


Photo courtesy of Gladstone Observer.

# A self-sustaining garden

John Last of Gladstone, Queensland, continues the story of his abundant, self-sustaining backyard 'no-dig' garden, which has won several prizes locally. See **A sense of humus** in **Earth Garden 39.**

### By John Last

Regarding the use of straw, I am now convinced that our garden has reached a level of fertility where it actually looks after itself. The number of bales of straw needed for mulching have reached an all-time low.

Our garden is producing at its best at the moment with just a little help from me . . . and Mother Nature is doing the rest.

I was successful in gaining second place in our local garden competition vegetable section in September 1984. The trophy was a set of silver goblets. To tidy up the vegetable patch before judging, I cut four loosely stacked wheelbarrows of lucerne, so I now really grow my own mulch. I also grow comfrey for composting. Plant residues from peanuts, corn, pawpaw, banana, sunflowers and other vegetable residues supply mulch or compost materials. I still have some bales of straw left from my 1982 supply, my compost container is full of compost ready to use and I am still cutting lucerne on a regular basis.

We are picking potatoes, carrots, silver beet, peas, lettuce, chokos, beans, beetroot, pawpaw and capsicum, with celery and cabbages and follow-up crops coming later. The onions were two to the kilogram, the cabbages about 5.5 kg each, with hearts over 25 cm across, the cauliflowers started at 1.7 kg, then were 2.2kg and finally 2.4 kg without the outside leaves. I picked about 4.5 kg of beans from six rows across the garden bed and 40 kg of potatoes during the growing season. All this despite the fact that the 550 mm of rainfall here during 1984 was well below our yearly average of 944 mm.

I also have many self-sown plants. The pawpaw trees in past years supplied over 300 pieces of fruit. Other plants that have been allowed to seed supply new seedlings only when the growing season is spot-on. This year I transplanted the celery from self-sown seed, as well as sharing with other Gladstone gardeners. Borage plants are scattered around the garden to attract bees when in flower.

I have shortened the maturity period for potatoes to 10 weeks and under by sprouting them in peat moss, using a liquid seaweed solution and only planting them in pure compost on the surface of the garden beds, then covering them with straw.

# Greeting cards

**By Heather Chaplin & Jean Bunnik**

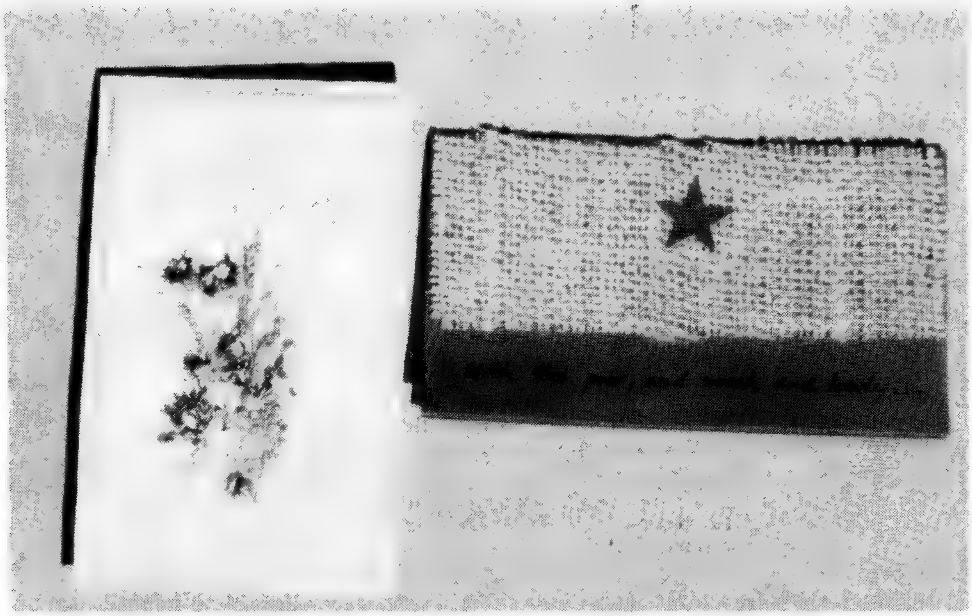
This is one 'recipe' for a greeting card for birthday, Christmas or other occasions that you can make yourself from paper and scraps.

**Materials**

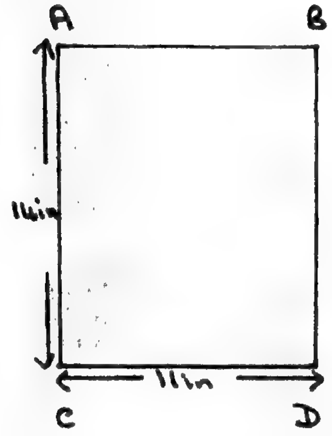
Drawing paper, 11 ins x 14 ins, clear scrap 'Contact', 4 ins x 4½ ins
pressed flowers
scrap of lace or braid, 14 ins x ¼-½ ins

**Tools**

Ruler, pencil, Stanley knife, glue.



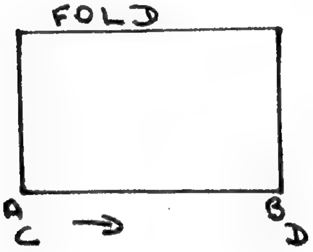
**Two nice handmade cards we received at Christmas, 1984. They were from Barbara and Richard Greaves (left) and Robin and Warwick Mosman and their families.**



**Method**

Fold paper in half, bringing A-B down to C-D corners.

Then fold in half again, taking A-C over B-D.



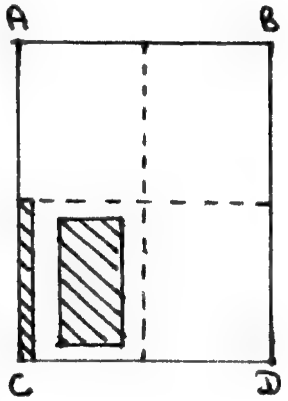
You should now have a card 7 ins high by 5½ ins wide.

Open out again and in the quarter section marked with the C corner, cut a strip just slightly more narrow than the braid or lace.

Also cut an oblong from the centre of this section.

On the inside of the C edge, stick some lace or braid, bringing the edge of the lace in line with the edge of the card.

On the inside of the A section, mark in lightly the 3½ ins x 4 ins oblong to match the one in the C corner.



Place in a pleasing arrangements of pressed flowers or leaves. Carefully place the clear contact over the flowers (you can lightly glue them in place first). Refold card into four.

Write a verse inside, or re-use a verse section cut from a used card, mounting it in the back of the B side and cutting a 'window' to frame it.

Finish off by neatly ruling a dark line about ¼ inch away from the edge of the windows.

# Wastepaper baskets

**By Margaret Gleeson**

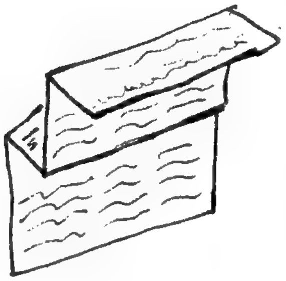
Making wastepaper baskets from old newspapers is another way of using wastepaper to add to the methods in **HARD TIMES HANDBOOK.**

They are great items for trading tables at fairs and bazaars, or for presents. I've helped primary school children to make them for quite a few years now.

**Materials**

Two circles of firm cardboard, each approx 7 cm radius.

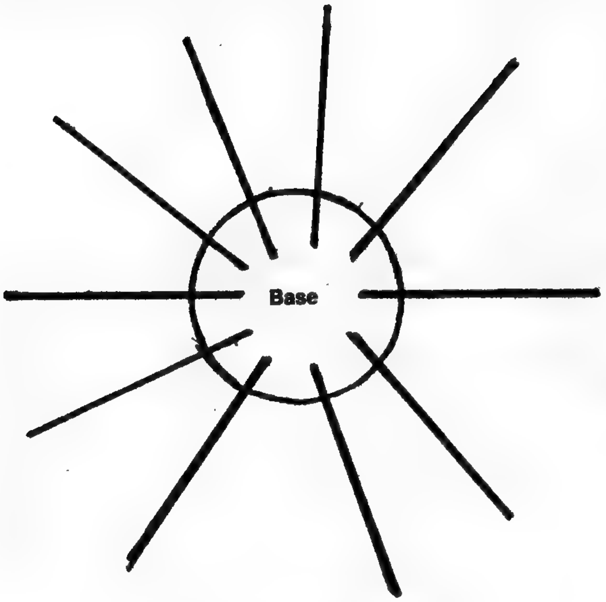
18 folded strips of newspaper, approx 30 cm wide, glued so they will not open.



**Method**

The newspaper is folded into strips and woven.

1. Place one cardboard circle on the floor and attach (with glue or tape) 10 newspaper strips equidistantly around its circumference. These strips will form the 'verticals'. Secure with a rubber band if you like.
2. Liberally slather glue on one side of the other piece



Paper strips approx equidistant around circle

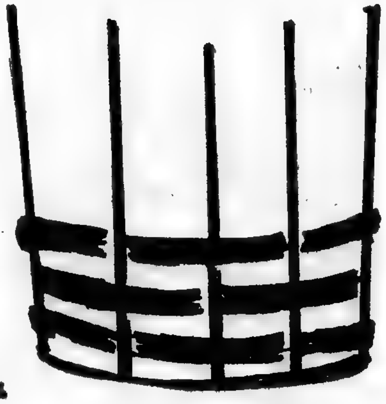
of cardboard and place one over your 'octopus'. Dry. The remaining newspaper strips are woven horizontally.

3. The first horizontal is most important. Check that one of your spare paper strips will go around the cardboard circle completely. If not, staple on some extra paper.
4. Now arrange your strips using the first one as a guide and make each succeeding strip approx 2-3 cm longer, so that the basket widens at the top.

First strip

2nd 2-3 cm longer

3rd, 2-3 cm longer than 2nd



Smallest circle at base

5. Staple each strip into a circle.
6. Now weave the circles through your verticals. Make sure they are in the correct order.
7. Fold over pieces of verticals level with the top of the basket and cut off at approx second strip down.
8. Tuck up and under the top strip, either on the inside or the outside. Glue in position.

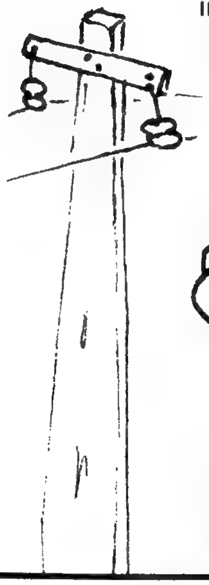
When dry, paint as required. Light colours don't take too well and darker colours will even need several coats. The kids use *Tempera* paints.

Designs may be painted over base coats. Don't forget to paint the cardboard bottoms. Varnish the wastebaskets to make them stronger.

## ALTERNATIVE DILEMMAS

Like pioneers we tried to live,
no power to light our home,
no roads, no water, no sewer or press
and never a telephone.

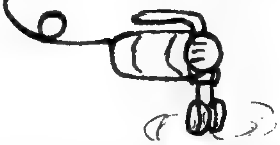
But three years later when lamps wore out
and kero prices rose;
we said "that's it — we can't go on
in early-settler's clothes."



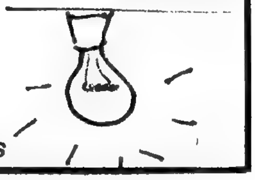
So in it came — no fuss — some pain,
240 volts to see.
The 20th century's back again
and ice cream's on for tea.

Electric saw and drill to build
a fridge to chill the cheese,
an iron to press the children's clothes,
a fan to make a breeze.

An amp, an organ, records too,
make music; be it *louder:*
mixer, blender, juicer, true
all help to stir the chowder.



We've almost been sucked right back in
from washing machine to pump,
but if you give us a TV we'll throw it in the dump.



There are only two things that we need, to cure
our current ills.
They are (1) a vacuum cleaner that won't erode the dirt floor,
and (2) a shredder for all our bills

— *Paul Nicholas*

# earth people write

Dear Irene & Keith,

After reading **Frugality as an ethic** by Bill Metcalf in **Earth Garden 43,** I felt a need to express a few ideas which I feel are relevant to the concept and practice of a low impact lifestyle, one which is gentle to the planet and ourselves.

Firstly, I think there is a fundamental reason for the gross imbalance apparent in the world today. On the one hand, a minority of the world's population wallow in food and affluence and the dis-ease and suffering that go with it. On the other hand, the majority of people are starving, turning to skin and bone. Why?

I believe that diet largely dictates the lifestyle, environmental impact and culture that a population produces. Looking at Australia as an example it is easy to see the huge impact 200 years of Aussie eating has produced. The countless millions of acres of forests cleared so far have mainly been to allow for the production of meats, grains, dairy produce and refined sugar; traditional staples in the western world.

In my books, none of these foods are intended for human consumption. In fact, their mucous-forming reactions, once ingested, are indicative of poisoning. All are excessive in their protein, carbohydrate or fat contents, resulting in high concentrations of acids and other wastes entering the blood flow. The production of these foods requires many times the land area needed to produce fruit and vegetables. Surely our 'affluence' originates in this simple fact.

I find it more than coincidental that in the first chapters of the bible it is clearly stated that the fall of man and woman lies in their diet. By ignoring this fundamental law, we have lost touch with the true essence of frugality and hence ourselves. Affluence and starvation are the result.

The word **frugality** is related to the word **fructivorous,** having a diet of fruit. Our true nature and potential and harmonious co-existence with the planet can only be fully realised by respecting our fructivorousness.

**Yours sincerely, Lander Clifton, El Arish, Queensland.**

Dear Keith & Irene,

Thank you for another year's good reading and I hope 1985 is prosperous for us all.

We would like to see some more articles on herbs and gardening in future issues, not so much theoretical as covered by most books, but based on people's personal experiences. We are still establishing our gardens at the moment and hope to be able to move much quicker this year if it rains, as we have just had a new dam completed next to our house.

**Regards to all, Bruce and Eleanor Charles, Goulburn, NSW.**

Dear EG People,

Does anyone out there need a radiographer? I'm looking for a position where I could work for two for three days a week, possibly in different hospitals. Pete and I would also be looking for a few acres to buy or rent, on which to live and work. We are prepared to move to wherever these things are available. Hope anyone who knows of a possible opening will write and let me know. It would be greatly appreciated.

**Thank you, Jill Pattinson, Station Street, Gerogery, NSW, 2642.**

Dear Keith & Irene,

I lost my husband two years ago, have arthritis and am in a wheelchair. Have just bought a wheelchair with electric engine traction and had a ramp built and am looking forward to reorganising my garden. I want to grow herbs and salad vegetables. Perhaps you could include some articles in **Earth Garden** with people like me in mind?

I intend to get in touch with Nan Barber of the Ryde School of Horticulture in Sydney, who, I heard on the radio, is looking into lightweight and long-handled garden tools. I have joined the Organic Growers' Association of Australia and the Henry Doubleday Research Association for interesting ideas.

**Love, health and happiness, Eileen Bowden, Miranda, NSW.**

*Dear Eileen — Good luck with your wheelchair gardening. You will be pleased to hear about the People and Plants Association of Australia, listed on our Access pages.*

**Irene & Keith**

Dear Earth Garden,

Who, in Tasmania, wants to sell us organically grown fruit? We have started our orchard this year, but it will take some time before we can eat the fruit from our own trees. We are mainly fruitarians and will need supplies for a few more years. Any fruit and any amount is welcome.

Also, we would like to buy a 3 p.l. tractor blade, a hammermill, harrows and a manual push-along lawnmower.

**If you can help us, please write to Mart & Rita Taylor, c/- PO St Helens, Tasmania, 7216.**

Dear EG readers,

Hopefully, we will soon have some land of our own. We will be moving to Launceston, Tasmania, in 1985 and would like to meet some nice easy-going EG people who live down there. I would also appreciate any information about public and alternative schools in the area and about correspondence and home schooling in Tasmania.

**Hope to hear from you, Philomena van Rijswyk, 69 Tableland Road, Wentworth Falls, NSW, 2782.**

Dear Irene & Keith,

We look forward to receiving the magazines each quarter and have enjoyed the travel sections on Keith's journeys. We live on 60 acres of undulating grazing land in a beautiful dairying district in sight of magnificent Mt Roland (1,234 metres high). We have a swift-flowing creek with Rainbow trout in it and live in a small pioneer style cabin as our temporary home.

At the moment we grow as much of our own vegies as we can and spend most of the time setting ourselves up, clearing more flat land for gardens and fencing, etc. This time next year we hope to have started on our chalet-style home on a hill site we have chosen with broad views across the valley and our mountain. Keep up your interesting magazine.

**Love, Maralyn, Terry & Katie Callaghan, Sheffield, Tasmania.**

Dear friends,

We are relative newcomers to your magazine and look forward to each and every copy. In a world gone mad, it's great to know there are sane people out there dreaming and doing with the same ideals in mind. We thank you for your efforts to help we people of like spirit to experience the more rewarding life through the pages of **Earth Garden.**

We are planning a mudbrick home in the Woodend area and without the advice and enthusiasm extracted from the many and varied articles in **EG,** we would not have our land and we would still be dreaming instead of doing. We wish all our **Earth Garden** friends the very best of life and happiness for 1985.

would still be dreaming instead of doing. We wish all our **Earth Garden** friends the very best of life and happiness for 1985.

**Peter & Jenny Evans and the girls, Romsey, Victoria.**

Dear Keith & Irene,

We hope during 1985 to be moving to our own mudbrick place which was inspired by one of your editions three or four years ago. We are making 12,000 Cinva Ram bricks for our house which will be built on 250 acres at Eulah Creek, east of Narrabri at the base of Mt Kaputar. It is a hard, hot climate, but we like it and get so much satisfaction when things actually grow.

Very pleased to read all the stories on solar electric systems **(Earth Garden 45)** as we may find ourselves going in that direction too. we have discovered our neighbour has an airstrip between us and the power lines, consequently connection is in the vicinity of $10,500; another trap for unwary buyers.

**A happy reader, John Fuller, Narrabri, NSW.**

Dear Earth Gardeners,

We are expecting our second child in May 1985 and because we think that a hospital is neither a place to be born nor a place to die, we are looking for a midwife to help us with a home birth. We can take the responsibility in 'normal' circumstances (no twins, normal position of baby) and so far there are no problems concerning the pregnancy. We live about 35 km south of Bundaberg, Queensland, in the bush and preferably the midwife should stay a while before the birth date at our place because we don't have a phone and it's a bit difficult to find us.

Something else. We would like to grow Jerusalem artichokes, but no one around here even knows about them. Maybe someone can send us some bulbs to start with, or knows where to get them?

**Thank you! Manfred & Sigi Stek, c/- PO Bundaberg, Qld, 4670.**

Dear Earth Garden people,

Despite being a Gemini, it is hard to write this letter. I believe the best way to begin is to say that reading **The One-Straw Revolution** by Masanobu Fukuoka (reviewed by Bill Mollison in **Earth Garden 25**) back in 1980 changed my life. If all people on Earth could read and put it into practice this new way of healing both our poisoned soils and our arrogance, at the same time reaping a bountiful harvest, we would indeed have peace on Earth.

Here, on a worn out ex-dairying farm, I have been starting to put Mr Fukuoka's principles of non-cultivation into practice. I firstly was fortunate in reading **The Survival of Civilisation,** by Hamden Weaver. To restore the quality of the soil to fertility as quickly as possible, I have spread crushed rock (by wheelbarrow or rucksack) over parts of the land with astonishing results, producing, for examaple, reasonable ears of corn on a remineralised section whereas the corn planted on an unmineralised section (previously treated with chemical sprays), produced a sickly corn which was inedible and tiny, with no seeds.

Dying trees have come back to life and started producing seed abundantly. The geese have produced goslings where last year there were none, only sterile eggs. Spider webs are everywhere and under the places where I have placed in order: (1) crushed rock, (2) seeds and (3) thick, freshly-cut grass to create mulch. There is a vigorous growth of clover, vegetable and grain seed, despite the hot sun.

Let me say that I have made mistakes, one of them being not covering the seeds with a thick moist mulch for the hot weather. In the cold weather (back in June and July) the seeds did not need mulch at all, as this farm is in the hills and has a fairly high rainfall.

The reason for this letter is to reach out to similar-minded people who may wish to share this beautiful place. I have investigated the possibility of a cottage industry growing, milling (a creek will power a little stone mill) and baking wheat for local sale. Experiments are on hand with several crops, such as millet, oats, wheat, corn and beans. Also 80 trees are to be planted. There are endless possibilities for making a good living with cottage industries in the old dairy. I am not very practical with machines and the like and the farm needs a man about the place and children's laughter, song and energy. There is permission to build a second home on the property.

I am 40 miles from Wodonga in the beautiful Kiewa Valley. **Earth Garden** people who are sincere and honest are welcome either to stay with me (either vegetarian breakfast or two meals) or pitch a tent by the creek. There is a small charge for this as then there is no obligation and the opportunity is there to 'feel the vibes' of the place.

Is there a family who would like to adopt a Grandmother? Hoping this letter may reach the right people, both for myself and for this land.

**Sincerely, Sheena McDuff, Acres Alive Farm, RMB 1105, Wodonga, Victoria, 3691.**

Dear Irene & Keith,

We have been reading **Earth Garden** since its first issue and find many useful ideas and inspirations in each issue. Even if there is nothing of direct use, it is always good reading. Perhaps other readers, like us, would find it useful to know what diverse sources of income are available, ie, social service, pensions, trades, local work, farm enterprises, arts and crafts, etc? We will finally be making the move in December and would like to hear from many readers and self-sufficient practitioners in the Deans Marsh area in the Otway Ranges.

**Paul & Julia, Alyssa, Penny & Clare Holohan, Thwaites Road, Yannathan, Victoria, 3981.**

Dear Irene & Keith,

It will be a couple of years before we move to our land in north-east Victoria. The elevation is greater than 500 metres and for only 2½ months of the year will be frost-free. We would like to hear from Earth Gardeners with experience and information on suitable vegetables, fruit, windbreaks, species and varieties, as well as flowers.

Also, does anyone have a simple and effective alternative to commercial toothpaste? A plain and easy knitting pattern for a jumper using 8 or 12-ply, suitable for either sex, would be useful too.

**Regards to all and with thanks, Neil Paulet & Janice Horsfield, Maxfield's Road, Flynns Creek Upper, Victoria, 3844.**

**Dear friends,**

**When I was a child the usual tooth powder was a 50-50 mix of 'carb soda' (sodium bicarbonate, or baking soda) and household salt and was rather tasty! The other traditional mixture of pulverised chalk and charcoal, I've never tried. Has anyone some more ideas on toothpaste? — Keith.**

Dear Irene & Keith,

Happy to see that the number of folks subscribing to **Earth Garden** is growing.

The **HARD TIMES HANDBOOK** is quite marvellous. We have used so many ideas from it. We are going to use many more in the future. Keep up the good work.

**Best regards, Ann Botting, Jimboomba, Queensland.**

Dear Irene & Keith,

We're working hard on the gardens and trying to get started on the house. Looking forward to summer. We're trying to get a market started this summer, so anyone coming to Kangaroo Island, please look us up. We've got 166 acres, so there's heaps of room for friends to camp for a few days. Give us a call for directions. Phone: (0848) 33034

**Peace & prosperity to all, Howard & Marilyn King, American River, Kangaroo Island, SA.**

Dear Earth Gardeners,

I think what I enjoy most in E.G. are the reports of successes (and failures! — pitfalls to beware of and how not to fall in next time), the joy of achievement under your own steam (we certainly steam here in this humid weather) and the interesting and everyday tales of how it all came about, which surely must inspire others who are a bit nervous of 'stepping out' for themselves.

**Peace & blessing, Gwen Wall, Aitkenvale, Queensland.**

Dear Keith & Irene,

Fellow conspirators, I've just finished reading a book about the evils of refined sugar, called **Sugar Blues,** by William Duffty. Maybe the subject would be worth your investigation, time permitting?

I am just discovering the benefits of a sugar-free diet. As the author says, beware of refined sugar in all its forms and guises.

Arthur & Emil Hansord, Koolan Island, WA.

Dear friends,

Thank you for your fine magazine. I look forward to my copy in the mailbox and I feel that my next step towards my goal will be through **Earth Garden,** or similar publications and newsletters. I'm just nearing the end of my first year of very simple living, although I'm relatively close to Sydney, but isolated. There has not been one moment of regret or doubt about the wisdom of my choice and I have spent about the happiest year of my whole life in 1984.

The first step, from Erskineville to Maroota, has enabled me to develop a sense of space and to assess my real needs, as opposed to my desires or dreams and I know much better now what I am looking for. So 1985 will see me considering my next move. Further away, for sure!

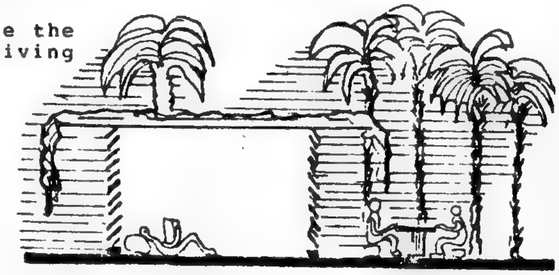
**Sincerely, Mary Trevena-Rowe, Maroota, NSW.**

## Energy Efficient Site Planning Handbook

Margaret Kay, John A. Ballinger, Ulrike Hora, Stephen Harris, Solarch/Housing Commission of NSW, Sydney, 1982, large format paperback, 176 pages, illustrated. Price $12.95.

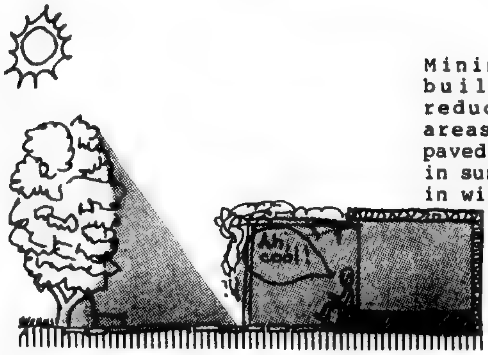
Distributed by Second Back Row Press, PO Box 43, Leura, NSW, 2780. Add $1.50 if ordering by mail.

While most of this work deals with energy-efficient designs on a large scale, such as sub-divisions and allotments (so, presumably clusters and communities?), streets and house block orientation for planners and designers, it also gets down to the individual house site. Full of imaginative design ideas expressed in simple graphics. Includes computer programs for calculating 'shadow mask' areas and instructions on developing 'solar access butterflies' for home sites.



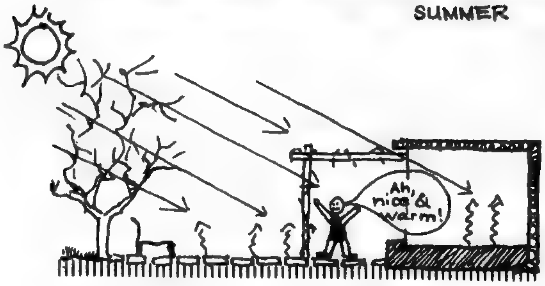
Planting should shade the house and outdoor living areas.

Provide year round shade.



SUMMER

Minimise energy intensive building materials by reducing amount of paved areas around house. Locate paved areas so they stay cool in summer and give off warmth in winter.


Ah, nice & warm!

WINTER

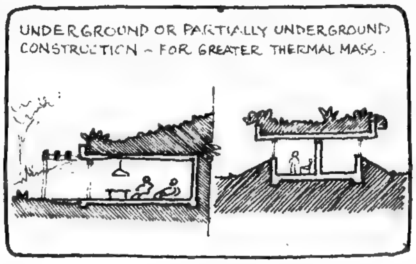
Reduce reflective glare and heat absorption in summer.

## Principles of Low Energy House Design

Compiled and illustrated by N. Hollo, Energy Authority of NSW, Sydney, 1982, paperback, 28 pages, illustrated. Price $5.95.

Site planning for the family low energy home, well explained in text and graphics. Sydney and NSW emphasis.

Our copy from Second Back Row Press. Postage about 80¢.



UNDERGROUND OR PARTIALLY UNDERGROUND CONSTRUCTION - FOR GREATER THERMAL MASS.

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# Finding true north

Magnetic or compass north is not the same as true north . . . as Greg Baker discovered when setting up his solar electric system, as told in *An electrifying tale* in *Earth Garden 44.* Solar cell manufacturers say that solar cell modules may be as much as 15° off true north and still collect 90 per cent of available sunlight, so with true north you can try for 99.9 per cent efficiency.

Knowing which north is true north would also be handy for siting beehives, solar water heater panels, orientating your home correctly for passive solar design and for laying out tree crops in a farm permaculture system. Greg tells us how to work it out.

### By Greg Baker

Here are four ways to find true north for those who want to aim their solar panels that way.

For the first two, find a horizontal piece of ground or get a flat board and place it horizontally. On this horizontal plane put a thin vertical rod.

**Method 1**

Observe the sun's shadow cast by the rod at around noon local time (standard time, not daylight saving time). When it has reached its shortest length, mark a line from the base of the rod along the shadow. This line lies true north-south. If you look along this line with the east (where the sun rises!) on your right, you are looking true north.

This method is of most use at larger latitudes, i.e. in the south of the continent. This is because there the sun's shadow of the rod is longer and it is easier to determine when it is at its shortest.

**Method 2**

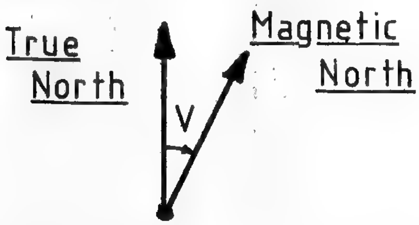
Draw a circle on the plane with the rod as centre. Mark the places on the circle where the end of the rod's shadow just touches the circle, morning and afternoon. Draw a line between these two points and put a mark at the middle of it. Join this mark to the base of the rod. This line lies true north-south.

This method can be used in northern Australia where the sun's shadow at noon is short or nonexistent.

**Method 3**

Find a good large-scale contour map of the area in which you are interested in finding true north. In the margin will be information on **magnetic variation.** Magnetic variation is the number of degrees difference between true north and magnetic north.

In most of Australia this variation is easterly, as shown in the diagram. In some parts of Western Australia it is westerly, i.e. magnetic north lies to the other side of true north from that shown.



The magnetic bearing of true north will be (360 —V) degrees when variation (V) is easterly. It will be simply V degrees when variation is westerly. Where I live, variation is 12 degrees easterly. The magnetic bearing of true north is thus (360 —12) = 348 degrees.

The magnetic bearing of true north is determined in this way and a good compass will then give true north.

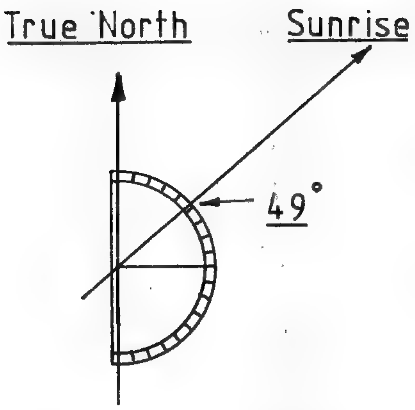
**Method 4**

This method has no particular advantage over the other three methods. However, it is more fun. The method is from **Amateur Radio Action** magazine, Vol 6, No 9, and is of use if the sun rises or sets on a distant horizon. It is not much use if you are hemmed in by mountains.

The method calculates the true bearing of sunrise or sunset at your latitude for any day of the year. Once you have calculated either or both of these bearings, using the formulae below, observe sunrise or sunset on the day for which you have done your calculations. Mark a line along the ground in the direction of sunrise or sunset, or, using a good compass, get its magnetic bearing. This is a reference direction you can use to get true north.

If you marked a line along the ground, use a protractor to get true north. For example, if the calculated true bearing of sunrise was 49 degrees, put the 49 degree mark and the centre of the protractor on your line on the ground.

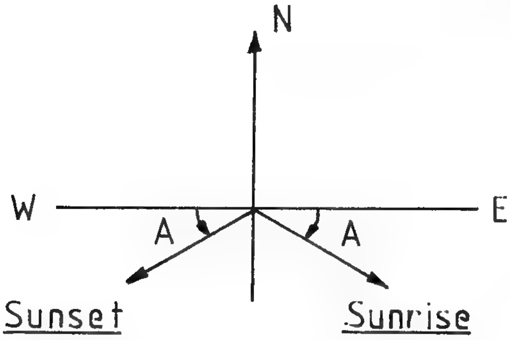
True north will lie along the line joining the centre of the protractor to 0 degrees on the protractor.



If you took a magnetic bearing, subtract it from the calculated true bearing. This is your local magnetic variation and you can then use Method 3 above to find true north. Note that in some parts of WA this subtraction will give a negative value. In this case, ignore the sign and carry on as in Method 3, but for a westerly variation.

The calculation of the true bearings of sunrise and sunset require two pieces of information. These are the number of days since the last September 21 (called **d** here) and your latitude (called **L**). You use these to calculate two things. The first is the **sun's declination** (called **D**), which is the latitude at which the sun is directly overhead on the day you are interested in.

On September 21 and March 21 the sun is directly over the equator (zero latitude) and declination is thus zero. On December 21 it is as far south as it will go — directly over the Tropic of Capricorn — at 23.4 degrees south latitude (declination 23.4 degrees south). On June 21 the sun is over the Tropic of Cancer, as far north as it will go at 23.4 degrees north (declination 23.4 degrees north also). So much for declination.



The other item you calculate is called **amplitude** (**A** for short). This is the number of degrees that sunrise and sunset are different from true east and true west respectively.

The third diagram shows the direction in which A is measured for sunrise and sunset.

So, using d, calculate declination (D) thus:

$D = 23.4 \sin (0.9856\ d)$

D and 0.9856 d are in degrees. D may be positive or negative. A positive value of D indicates south declination and a negative value north declination.

Next calculate

$\sin A = \sin D / \cos L$

Hence find the value of A.

A will have the same sign as D. Thus if D is positive the declination of the sun is south and the amplitude A is positive. If D is negative, the declination is north and A is negative. In either case, the true bearing of sunrise is (90 +A) degrees. The true bearing of sunset is (270 —A) degrees.

For the calculations, dust off your old mathematical tables, get the slide rule out of the bottom drawer, or use a calculator with trigonometric functions.

**Example.** As an example, I will calculate sunrise and sunset bearings for June 2 (d = 254 days) in Sydney. Sydney's latitude is 34 degrees (L = 34.0).

First find

$D = 23.4 \sin (0.9856 \times 254) = -22$ degrees 2 minutes.

Next calculate

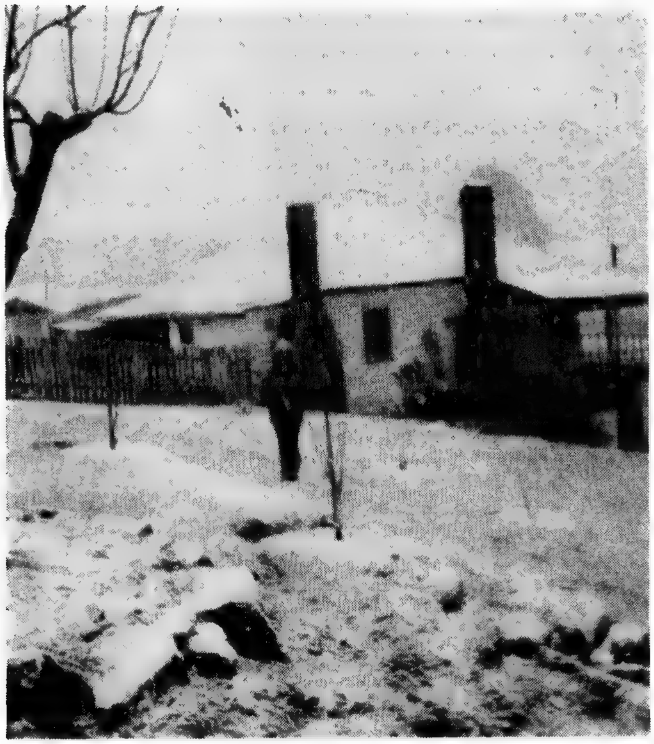
$\sin A = \sin (-22° 2') / \sin 34° = -0.6710.$

This implies A is —42 degrees 9 minutes, say —42 degrees. Hence sunrise bears 90+ (—42) = 48 degrees true, and sunset bears 270— (—42) = 312 degrees.

Using these values, refer back to the beginning of Method 4 for what to do with them. A different description of this method and another example are in **Amateur Radio Action.**

**As I said, fun.**

# A year passes



**By Ray & Tricia Hawthorne**
**Franklin, Tasmania**

A year has passed and, oh what a year! Many things have happened just in the short time since we wrote *(A moving story, Earth Garden 42).*

Not the least was the dreaded winter, which passed without a murmur. To be honest, it was one of the mildest winters for many years according to the locals. We did have snow on three occasions, a lot of rain, strong winds, three overnight zero C. minimums and eight days where the maximum daytime temperature did not rise above 5°C.

This might sound terrible to some people, but it was nowhere near as bad as we'd expected. Intermingled with the gloom were many, many calm, sunny days and we were housebound only a few occasions. In fact, we got an enormous amount of outside work done, especially fencing.

Our wood stove kept the kitchen lovely and warm as well as providing a constantly-boiling kettle for well-earned tea breaks.

When we first arrived here a year ago our aim was to be as self-sufficient as possible (though we don't believe it is possible to be totally so), with no leanings whatsoever towards any commercial enterprise. We were ready for exchange, barter and trade, but we had no grand money-making schemes. This has changed to some degree.

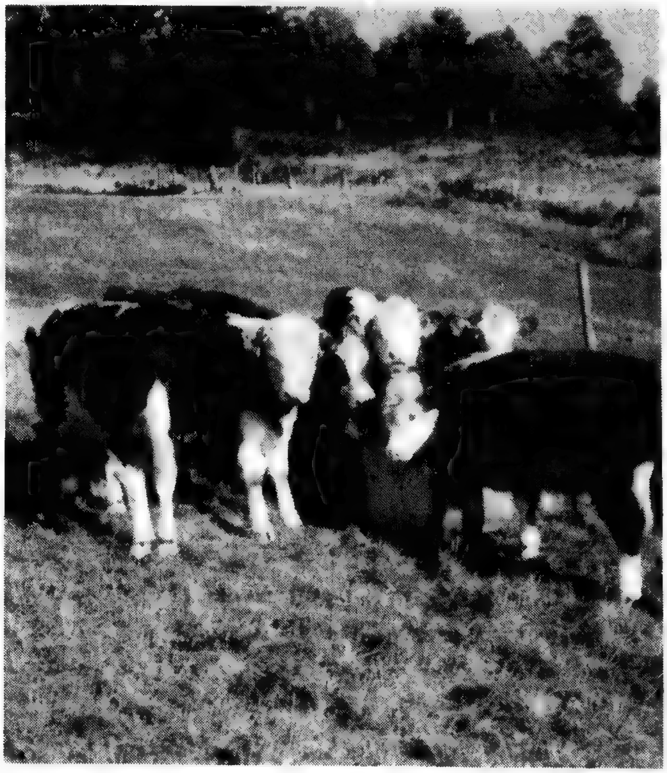
We have 25 useful acres and the small number of stock we had — two calves, three goats and 10 chooks — were not enough. Let us explain. Our land is a mixture of good pasture (50%), rough land (30%), ideal for goats, and forest grazing (20%). We read and soon discovered for ourselves that if land is not grazed it will soon get choked with weeds, the grasses will run to seed and become dry, resulting in a fire hazard, and the property will deteriorate in a few short years. The land will become a breeding ground for rabbits and weeds, a source of great annoyance to neighbours and thoroughly useless.

Of course, finding the perfect balance to ensure that the property is not overgrazed is of the utmost importance. We found the local stock agent extremely helpful in this regard and we subsequently bought 10 nine month old Hereford steers for fattening.

It is quite remarkable the effect the steers have had on our property and our lives. They have given us an added interest and the incentive to improve the property, to upgrade our fences and control the weeds. The place is starting to look in better health and we are proud that our small-holding looks and feels useful. Any added income from "our boys" will also help our tight budget (we do not draw the dole).

As we mentioned in our last article, we cut 506 bales of hay from our hay paddock, which was, of course, too many for our needs. We decided to sell the excess and cut fresh this year (1984), but only doing half the paddock, cutting alternate halves each year. The money we got from selling the hay was nice, but it doesn't make sense to export huge amounts of organic matter from the property — much better to let *our* animals dung it back on the paddocks. If we cut only half it is also easier to bring in the hay.

Not all things happen in farm life as portrayed in books and on TV. One such incident occurred late one August afternoon. We got a call from friends nearby asking for help as one of their heifers was about to calve. When we got there we found her running around the bush, with two little pink hooves protruding from her rear end and she had apparently been like this for some time.



This was not your average well-behaved, domesticated milking cow as seen in programmes like *All Creatures Great and Small,* but a half wild Hereford. She obviously needed help, but was not prepared to go into the shed where the vet. could assist her (our friend does not have a cattle race).

When we finally did get her into the shed, the next problem was to get a rope around her long, curling horns in an effort to restrain her. Not an easy task with a beast weighing around 400-500kg, but we finally accomplished this just before the vet. arrived.

Much to our amazement, the vet. did not call for "hot water, soap and a towel", but using a long pole and lever contraption, began to winch out the calf which was presented the wrong-way-round, rear feet first, when mum had just about given up. The vet. cleaned up the calf's feet and nostrils, gave it a few hefty slaps and it sat up. We untied the mother and got out of the way so she could do the business of cleaning her calf. However, her reaction was again unexpected. She virtually ignored the calf, treading on it on a couple of occasions in her efforts to get out of the shed.

After a while she was getting so agitated, we felt we had to let her out, hoping she would return to her calf later on. Many times through the night we checked but, much to our disgust, she ignored her responsibilities. So some colostrum was obtained from a local dairy farmer and the calf was bottle fed for the next three to four days and allowed to run with the rest of the herd. She was seen cadging a drink whenever possible from any cow that had milk. One of the older cows finally accepted her as her own and they are both thriving.

There was a similar incident not long after. A friend who runs goats had a doe about to kid which had been missing for two days. Apparently she was folowing her natural instinct to "go bush" to give birth. We searched everywhere, but to no avail. She was found two days later almost by accident in bush on a neighbouring property. She was well, though distressed, with her two kids dead. This doe is a domesticated, well-bred milking goat with a large udder and huge teats. It was obvious that the poor kids couldn't get their little mouths attached to the tats to get a drink. What a tragedy!

Lots of good things also happen on the farm, of course. Our chickens are all laying well and supplying us with lots of eggs. We got a pure *Barnevelder* rooster, who we've called Barney, to bring in some new blood, so it won't be long before we have some newly-hatched chicks running about.

This very morning, just before 8 am, on our way from feeding the chickens to open up the goat house we heard tiny noises which could only mean newly-born kids. We ran the rest of the way and when we opened the door saw two beautiful little does, still pink and wet and not more than 30 minutes old. Our two other goats were looking on with interest, but with no concern, as though it was an everyday occurrence, though they are both maiden does.

The mother seemed quite well and in no distress or discomfort (afterbirth in the bedding). We watched anxiously and with some frustration as the two babes searched all over their mum's body for teats. Even when they were almost on it, they moved to somewhere else, still searching. Of course they finally succeeded and, oh, what a beautiful sight to see mum standing so patiently and two little tails wagging furiously in the air. That first drink of colostrum is so important for the newborn animals. What a relief!

We fed the mother doe some warm bran mash and made sure she had hay and fresh water. The other two goats went about their daily grazing routine without their friend; there seemed to be a definite understanding of the situation. Normally they stick close together and there is a lot of bleating if they get separated.

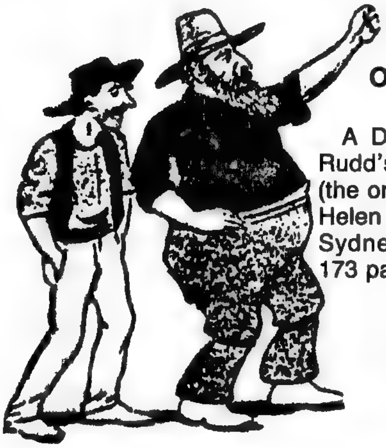
Everything in the garden is floursihing and did so even under the snow. We've had a constant supply of homegrown vegetables since last December, with things growing here easier than we'd expected.

*We must mention the broccolli.* In supermarkets here prices range from $3.49 to $5.99 per kg. We remember it from Perth as a luxury vegetable, for eating on special occasions. Yet we've found that broccoli grows so easily here and we've been harvesting it for six months, though we only grew 12 plants. The large flowering heads come within a few weeks of each other, so we bartered some and froze some. After cutting them, the side shoots start appearing all over the plant. These can be harvested and eaten just the same and the more you cut them, the more they seem to grow and they're delicious.

Yet cauliflowers, with which we also had great success (we won't boast how big they were), in season sell for about 89c a head and probably weigh 2kg (45ckg). They are more difficult to grow and once cut they are finished. It must be one of the biggest frauds of all time!

For the first time in many years we're looking forward to the summer, not dreading the oppressive heat we used to endure in Western Australia. We'll end with a quote from Geoff Rawlings at *Organic '84* at Richmond, Tasmania:

*"Everyone must have a goal. If that goal is to do nothing, you will probably succeed, but you will not be fulfilled."*



## On Our Selection

*The Play*

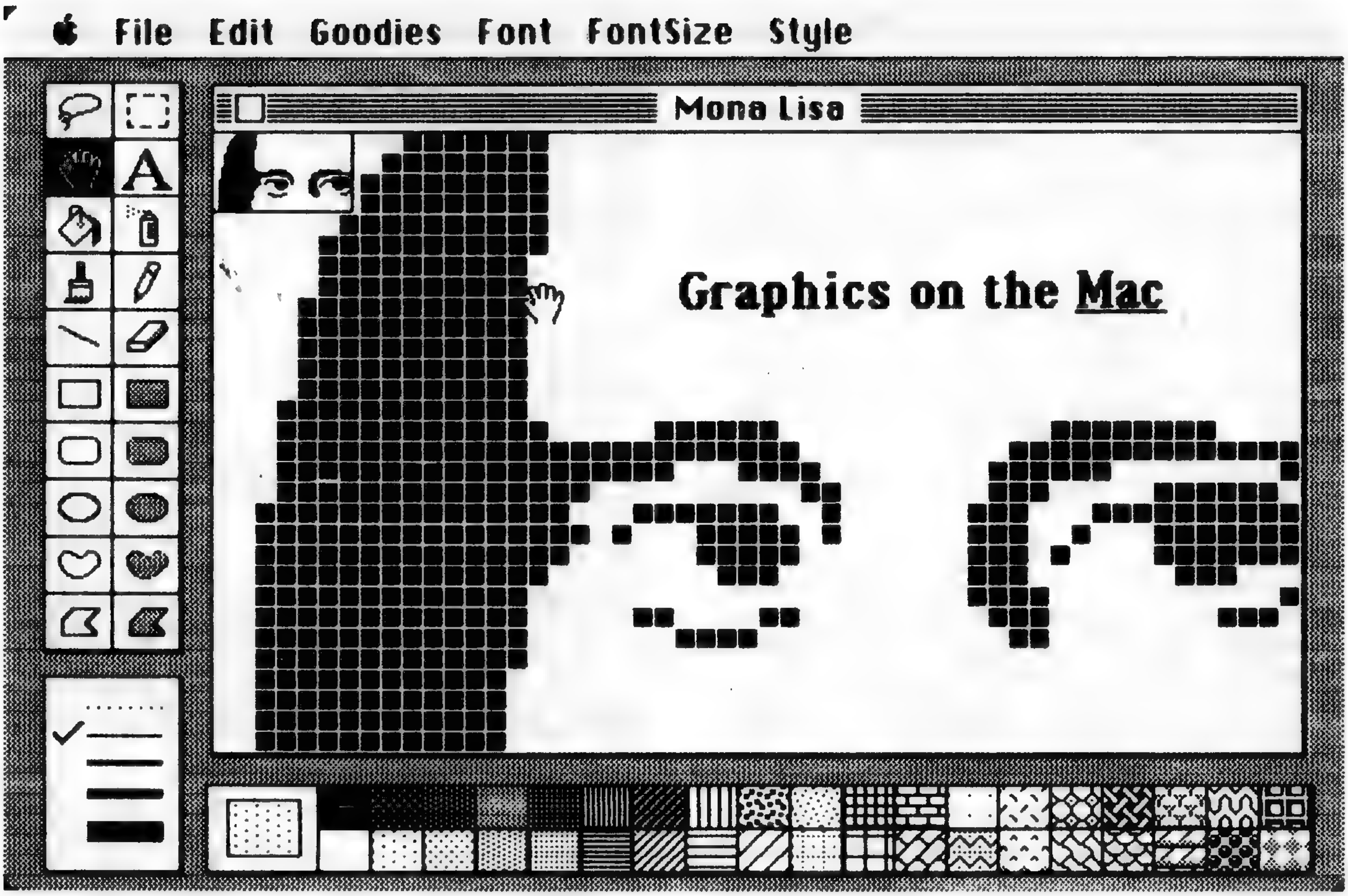
A Dramatisation of Steele Rudd's Books, by Bert Bailey (the original 'Dad'), edited by Helen Musa, Currency Press, Sydney, 1984, paperback, 173 pages, illustrated.

With its background of the bush and Dad, Dave and the Rudds as battlers, *On Our Selection* is a play which has become part of our Australian folklore.

Here is the famous version which ran from 1912 to 1929 in various revivals and which was the basis for Ken Hall's film of 1932 (seen recently on Channel 0-28 television). It was dramatised, with considerable additions by Bert Bailey (who first played 'Dad'), from the original short stories by Steele Rudd (Arthur Hoey Davis), first publshed in 1899.

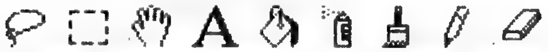
It would be a marvellous choice for this year's play at your local school. With this edition of the text and its history, edited by Helen Musa (a theatrical historian and drama mistress), the problem of its characters becoming caricatures could be avoided.

Notes on producing the play suggest the addition of a bush song here or there — and there is plenty of humour of course!



**The enigmatic expression of the Mona Lisa is transferred across the centuries from Leonardo Da Vinci's famous original to this computer version, 'clipped' from ClickArt. The technique the computer artist used to draw the eyes is seen in the dots or pixels from 'Fat Bits' in Apple's MacPaint program.**

## THE MACPAINT TOOLBOX



These symbols represent the essential tools used to draw illustrations in the MacPaint program designed for the Apple Macintosh by Bill Atkinson in 1984. They are laid out in the left-hand panel of the MacPaint screen printed out at the top of this page.

To draw on the screen ( here filled with Fat Bits dots), you click the button of the Macintosh mouse on the symbol you need. This is then highlighted (and shown reversed). You will see that the hand shaped icon, or 'grabber' is being used to view parts of the drawing out of the viewing area.

The lasso and dotted box are used to select graphics. Once selected, they may be moved anywhere on the screen, copied, cut, inverted, rotated, outlined by traced edges and expanded or contracted.

The capital A represents text, available in the same variety of fonts, sizes and treatments (outlined, shadowed, bold) as in MacWrite, but bigger (up to 72 point, about an inch high).

The paint pot or bucket will pour any of the 38 different shading patterns shown in the palette along the bottom edge of the illustration into the screen or any shape you draw. The current pattern is the dotted design in the larger box at the left. The spray can will spray on any pattern from the same selection.

The paintbrush and pencil are the chief artist's tools. The pencil may be used in Fat Bits, in the Goodies file, to add or remove single dots. You select brush thicknesses from the window at the bottom left and there are 32 brush shapes from which to choose. If you want to achieve a pattern like a kaleidoscope, you can choose one of several 'brush mirror' designs which will draw identical patterns on the screen (another Goodies option).

The rubber, or eraser, will wipe out what you don't want, or click the mouse twice to erase the entire screen. The other tools include hollow rectangles (with square or rounded edges), circles and shapes, and straight lines. Solid shapes are instantly filled in with the current pattern.

Though you see only an 'active' part (about one third) of the page size in MacPaint, the full page layout may be viewed at any time. You soon become adept at using the Mouse as an extension of your hand to handle the brush or pencil and quickly pick up computer drawing skills.

MacPaint is an incredibly creative box of tricks. Use it to draw square or pie-shaped charts filled with any pattern, illustrated memos or articles, personal greeting cards or invitations to a picnic, to design rooms, furniture or houses, draw headings or labels...These are just a few ideas.

The Macintosh Imagewriter printer can duplicate any graphic on the screen in either draft mode or high resolution. Images may be saved, or easily transferred from one disc to another. Being confined to black and white will be an obvious frustration for amateur and professional artists - which is about the only minus against the many pluses for MacPaint.

☐ The Apple Macintosh package reviewed in Earth Garden 44 is now priced at around $3,500.

## The 'hidden icons'

There is a bank of small icon-sized graphics hiding in the memory of the Apple **Macintosh**, which are not mentioned in the computer's documentation. You have to find them yourself or hear about them from another **Mac** user. They are obtained by holding down the shift and option keys while pressing the top left hand key of the keyboard. Then as you scroll through the type fonts and sizes you'll see these little figures, for example in Geneva (this font) you get:

9 point 🐑 10pt 🖥 12pt🐇

14pt◢ 18pt🐑 and 24 pt 🐇

These can be highlighted or outlined as for normal fonts,

for example a bold sheep 🐑 or a shadowed rabbit 🐇

It's great fun to be able to throw a ♥ (18pt New York)

or a 🤖 🤖 or two (plain and shadowed 24pt New York). into a letter.

The figures can be much larger in **MacPaint** (up to 72 pt).

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Review copies loaned by **Chapman Consulting Services**, 39 North Rocks Road, North Rocks, NSW 2151. Send SAE for list of computer hardware and software available by mail order.

## Mac the Knife

A Clip Art Treasury for the Apple **Macintosh**. Volume 1. Price $64.95.

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Mac the Knife is like an art gallery on a computer disc, with more than 500 varied illustrations to drop into your **Mac** documents or to print out and use wherever you may want them.

The artwork ends up on your own **MacPaint** screen, though transferring a page full of images there involves a fair bit of swapping between the two discs (up to seven swaps). But, at least at the beginning, the anticipation of what will pop up next is part of the fun.

Graphics in the library include Fun Pix, shown in the photo, icons of international symbols, animal outlines, maps, labels for your discs, clowns, engravings of the pyramid on the U.S. dollar and a Japanese lady with flowers in her hair, to name a few.

You can alter the drawings using your **MacPaint** tools, or shift to Fat Bits to see how the artist drew them. There's a different set of patterns on your palette as a bonus.

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## ClickArt

For the Apple **Macintosh**. Price $69.95.

ClickArt is a more consciously arty collection of 100 drawings, symbols and borders. After you've printed out a portrait of Boy George or Albert Einstein, or a series of U.S. presidents, it seems static. The best recreation is Michaelangelo's David which now adorns our kitchen wall (without fig leaf).

*PLEASE READ THIS CAREFULLY*

*Land lines is a free service, restricted to current Earth Garden subscribers who wish to buy, sell, lease, caretake or seek land. It is not a lonely hearts column.*

*Subscribers must include their name, surname and full address as proof of sincerity. They are responsible for checking all deals thoroughly. Please keep listings to 50 words, plus the address.*

Land for sale: One-quarter share in a young land-sharing community in quiet northern Tasmanian mountain valley, being 5 acres of a 64 acre bush block (44 acres remain in common), with clean mountain water from a permanent creek. Share includes mudbrick cottage, shingle roof, combustion stove, some fruit trees, veggie garden and some acres uncleared. Our price is $15,000, though negotiable, to caring, conservation-minded people.

Contact Phil Young, c/- PO Lemana, Tasmania, 7257.

For sale. Brick veneer tiled builder-built 1982 cottage on square half-acre. Two beds, lounge, kitchen, family, Solarhart, Everhot combustion stove, town water, septic. On sealed road. Fibro garage/workshop 6m x 6m, fernhouse, two rainwater tanks. Clarencetown is peaceful, on the Williams River, 45 km to Newcastle, 30 km to Maitland, population 500. Price $75,000 negotiable. Interested?

Further information from Edie Connellan, Prince Street, Clarencetown, NSW, 2321. Reverse phone: (049) 96 4313.

# land lines

We are looking for people who would like to caretake our beautiful 25 acre property high in the hills around Nimbin, 20 miles from Lismore. An octagonal pole house with mudbrick walls is a few weeks away from completion. There is a shed and goat-fenced yard, a chook pen and a fenced vegie garden. It's a frost-free area with stunning views, a permanent creek and small dam.

Please phone Alan Gordon or Wendy Rous on (066) 87 1697.

Conservation-minded people with a commitment to community living are invited to make enquiries to Bundagen Community. Memberships are occasionally available to suitable applicants.

For information, write to Membership secretary, Bundagen, c/- PO Repton NSW, 2454.

North Queensland, 16 acres miner's homestead, perpetual lease, 90 km inland from Cairns. Almost complete open plan house, phone, fully fenced, lovely creek, dam, bore, other extras including new pump and generator, 6 km to highway, all-weather dirt road, 10 mins school bus, 1½ hours to coast. Price $25,000.

Phone Vicky Bayfield, (02) 327 1566, or write, C/- 18 Victoria Road, Bellevue Hill, NSW, 2023.

We have a 100 acre block situated on the Donelly River, about half-way between Nannup and Pemberton, right at the point where Barlee Brook meets the river, about 3 km off the Vasse Highway. We are prepared to offer one corner of about 5 acres to a Christian couple on a 99 year lease.

Would anyone interested please contact Wayne or Evelyn Crow, 23 Gregory Street, Wembley, WA, 6014. Phone: (09) 381 7237.

Mountain retreat, Northern Tablelands, NSW. Hand-built house on 140 acres of stringybark forest. Elevation 3,000 ft. Established large garden and orchard with nursery facilities. Sheds, workshop and two dams. Complete alternative lifestyle without electricity, peaceful and simple. Price $65,000.

Write Kevin Free, 'Vipaka', Walcha, NSW, 2354.

For sale: One-quarter share in 94 acres in the Tweed Valley, includes 99 year lease on approx 20 acres with creek frontage and rainforest, plus comfortable timber, stone and mudbrick home. Septic, electricity and phone. Tank water with pump to creek. Vegie garden, fruit trees, chooks, ducks. Handy school bus. Price $50,000.

R. & R. Blunden, c/- PO Uki, NSW, 2484. Phone: (066) 79 5266.

For sale: 25 acres, 25 minutes from Grafton, NSW, ¾ cleared and fenced, ¼ timbered, new two-bedroom home with solar power, open fire, combustion stove, phone. Four-berth caravan, concrete and steel water tanks, dam, power available. Price $80,000.

J. Sturm, c/- Mrs G. Luther, Wooli Road, Pillar Valey, NSW, 2462. Phone: (066) 44 8314.

For sale, 17 acres of land on school bus route in lovely Tweed Valley. Beautiful views of Mt Warning, three miles from Uki school, 2 miles from Murwillumbah. With recently renovated family home, garage and lots of space underneath, large concrete workshop. Permanent creek and concrete storage tank. Fruit trees, including citrus. Price $120,000 o.n.o.

Mrs D. Page, PO Box 450, Murwillumbah, NSW, 2484. Phone: (006) 79 5134.

Sunshine Coast, 40 minutes to Noosa, 10 acres in hilly tree country with two-bedroom solid cottage suitable for weekender or temporary home. Wood stove, gas fridge, chip heater, generator, 60 fruit and nut trees, veges, herbs, landscaped native gardens. Spring-fed dam, pump, tanks, irrigation. Long road frontage, suitable for sub-division. Private, yet school bus passes gate. Mudbrick studio, very successful. We are sad to leave as it is beautiful, but we are moving to a community 11 km away. Price $52,000 negotiable.

Jane Woolridge, M.S. 626, Pomona, Qld, 4568. Phone: (071) 85 4248 or 86 8184.

For sale: 11 acres of lightly wooded, undulating hilltop property. Frost and flood-free on bitumen road, 8 miles from Kingaroy, Queensland. Electricity and phone available. Large dam site, virgin soil. The ideal spot for that dream castle you always wanted to build.

John Antony, M.S. 537, Kingaroy, Qld, 4610.

$10,000 buys a half-share in ⅓ acre at South Ballina, NSW, 2 km midway between secluded beaches and river. Approved dual occupancy area. Mutual agreement and terms in planning homes. FHOAS available.

Practical, resourceful partner, please write to Paul & Esther dos Remedios, PO Empire Vale, NSW, 2478.

To rent. Couple with 6 children, one on the way, would like to rent old farmhouse with 4-5 acres for goats, as we have two handicapped children who need goats milk. Prefer close to Murray River area in South Australia. Will answer all replies.

S. J. Robinson, First Street, Wirrabara, SA, 5481.

After years of negotiating with the local City Council we have at last got a Multiple Occupancy deal that ensures that you can sell your land or house as a going concern if you want to move on at any time (none of us can see into the future, can we?). The Federal Government has also intimated that the First Home Owners' Loan would be acceptable under *this* particular M.O. We don't know of any similar scheme that has been accepted for the loan in the past because the title has not been 'clear' to their satisfaction. Perhaps readers would be interested to comment on this?

Our Blue Springs Hamlet development (36 sites) is beside a National Park at Nimbin and $10,000 will get your exclusive 2 acres with another 200 acres of common ground. This sum includes roads, dams, legal fees, etc.

Anyone wishing info can contact Blue Springs, The Old Butter Factory, Cullen Street, Nimbin, NSW, 2480. Phone: (066) 89 1388.

For sale, 2 acres at Broken Head, 7.5 km from Byron Bay. Bitumen road, school bus goes past. Lightly treed area, small dam, birdlife and a few kms to good fishing. Fenced, except for frontage. Price $45,000.

Please write to Louise Foster, RMB 3112, Broken Head, via Byron Bay, NSW, 2481. Phone: (066) 85 3293.

For Sale, 5 acres just outside of Snake Valley, about 18 minutes drive from Ballarat. There are plenty of mudbrick houses in the area. Plenty of trees. Building permit available. We're selling because we've bought a house in Euroa. We are asking $7,800, but will talk over the price with people interested.

Write to John & Yvonne van Anholt, 7 Branjee Road, Euroa, Vic, 3666, or phone (057) 95 2059 for directions or plan of land.

For sale, 26 acres near Toowoomba, comfortable three bedroom timber home, hayshed, new cattle yards, 10 unit piggery, 12 acre cultivation paddock and seven grazing paddocks, permanent creek, bore with windmill and tanks, irrigation licence applied for. Mains electricity, phone, 3 minutes to store, school and pub. Price $90,000.

D. G. & D. M. Cheetham, Whittakers Road, Southbrook, Qld, 4352. Phone: (076) 91 0204.

Tasmania: property wanted. Minimum 15 acres, some bush. Liveable 3-4 bedroom cottage, outbuilding, permanent water, Preferably within 3/4 hour drive of Devonport, Launceston or Hobart. Priced approx $40,000 to $50,000.

Reply: Greig & Laurie de Wit, 9 Cavill Close, Holt, ACT, 2615. Phone (062) 54 4086.

For sale at Upper Eden Creek, 16 km from Kyogle, northern NSW, two lots being subdivided — 200 acres, $51,000; 350 acres, $71,000. Both properties hilly, partly timbered, with good pastures and creek frontage. Further subdivision possible. Also house, two bedrooms and sleepout with 25 acres, $49,000.

Eva and Ranier Taeni, Yulunga, Barkers Vale, via Kyogle, NSW, 2474. Phone: (066) 89 7231.

### TAROT LINE

I wish to purchase a parcel of land in northern NSW. One of the ways to raise the 'filthy' money is by reading tarot cards. If you send either your date of birth or a physical description of yourself, with a question, I will send you the tarot answer. I will also keep a record of your name and address. When the land is secured, I will contact you and tell you the location. Anytime you are passing that way and want a break, you'll be most welcome. I do not have a set charge for the reading. It is on a voluntary donation basis, but all money received will go towards this land.

R. P. Wilson, 12 Terrigal Street, Mornington, Victoria, 3931. Phone: (059) 75 1101.

### HERB LINE

Good range of herb plants available for sale or exchange.

Please phone Jan Crittenden on (076) 6 1498, or call at 17 Clarke Street, Warwick, Qld, 4370.

We would like to meet people who may consider becoming involved in a large-scale natural farming and, possibly, industrial adventure in the near future. This is a capital venture and though we have little money at present, would look to using the combined power, firstly to provide security and work; later to influence and improve lifestyle. We have a few skills and ideas. Anyone like to have a talk?

Ray & Vicki Taylor, Box 38, Douglas Park, NSW, 2569.

We are the owners of 21 acres at Kyogle in northern NSW. The farm is on the outskirts, with town water, beautiful views, two bedroom-two sleepout home, ceiling fans, combustion stove and electric stove, carport, chook yards, cow bail and vegie garden. We are looking for some organically-minded folk who will carry on looking after the place, renting with option to buy after 12 months, if the place suits you. Come and try the real goodlife and see what you think. Meanwhile we are on the move to 7½ acres at Mullumbimby.

If interested please phone on (066) 32 2022, or write to Allan & Jill Morris, Summerlands Way, Kyogle South, NSW, 2474.

We are a non-profit research and education association, whose purpose is the revival and maintenance of the autonomous native European creativity and promoting the arts, crafts, sciences and ecological agriculture through the sponsoring of a variety of projects. The Association is supported only by private grants, donations and membership dues.

We are located in the foothills of the Pyrenees bio-region, with a house in a small village. We also want a shoemaker to settle here, so as to provide inexpensive, quality footwear. In a property of 40 ha (100 acres) we have begun the creation of an ecological hamlet, rehabilitating an abandoned area and preserving it from tourists and commercial agriculture. Membership is 50 Francs annually. Make cheques payable to: Las Encantandas Ass 1901.

Send international money order for further information to Las Encantadas Ass 1901, Ferme la Garrigue, 11300 Festes St Andre, France.

Paradise Regained — at Eden on the far south coast of NSW. We have nearly 1000 acres in the coastal hills near Eden and will sell about 2/3 so that we can afford to keep the rest. All natural forest, about an hour from clean beaches, a couple of hours from snowfields, good rainfall, mild climate, plenty of wildlife in a shire voted nuclear free. We will sell approx six 40 acre lots and three big ones, over 100 acres each, all with a bit of creek. From $400 to $800 per acre, depending on the size and location. We will send maps, info, prices.

Please write N. & S. Moyser, 'Eden', PO Box C63, Clarence Street, Sydney, NSW, 2000.

Newcomer of German origin, 50s, owns 540 acre cattle farm in Maryvale, half hour drive to Warwick, 1¼ hours Brisbane, 600 metre elevation near the Gap. Power, phone, school bus at door, permanent creek, irrigation licence for four acres, 400 square metre greenhouse, 50 square metre grow tunnel. Lots of young, different trees. Most tools and equipment. Wants to grow small crops — garlic, onion, etc in greenhouse and trees, shrubs or herbs for commercial and self supply.

Has no greenfingers (former businessman). Looking for partner male, female (couple preferred), working together and sharing 50:50. Partner to do marketing. Will need to have caravan at first. Will help to build home. Have experience in tools and building. Interested in long-term partnership with hard workers with necessary skills. Needs only money to cover half of starting costs. Religion, kids, origin, no objection, as long as heart is right and sense is fair.

Yours sincerely, Georg Peter Manske, Hillside, MS 394, via Warwick, Qld 4370. Phone (076) 66 1142.

## SOLAR OR NUCLEAR?

Dear friends,

Welcome to 1985. At the start of our 13th year of publishing *Earth Garden*, you can see in this issue that we are continuing to bring you practical applications of self-reliance technology, in this instance covering the ways we can provide an independent water supply. Last issue we dealt with solar electric systems and in EG45, out in May, we plan to deal more fully with power from the wind. If you have experience using windpower, we'd like your story to share.

When we began *Earth Garden* in 1972, the idea of harnessing natural forces of energy was generally considered to be an unrealistic pipe dream. All that has changed, as the stories over the years from people actually 'doing it' have shown. It's always been our aim for our magazine to be a forum of facts and sources of information to enable our readers to put these ideas into daily living.

Whether or not Australia should export uranium or have nuclear power stations are questions causing conflict today. The decisions will have a great effect on us and our children. We are trying to show that practical applications of solar, wind and water power can supply all our energy needs over the whole vast area of sun-rich Australia at reasonable cost. In short, there is no need for us to face the hazards of nuclear power generation.

**Down to business.** The cover price of *Earth Garden* is now $2.75 and we are keeping to our policy of subscribers receiving the four issues posted to them at no extra charge — that's $11.00. *Subscribers are sustainers!*

**Mail.** It makes us happy to see so many people changing their address and moving to the country, but it causes us some problems at this end if you don't let us know where you live and then write to ask what's happened to your copy. We can't be responsible for issues not received unless we have an address change two weeks before our publishing dates in mid-February, May, August and November.

**Back copies.** Our special offer for the set of EG1 to EG36 for $50 has resulted in back issues becoming rare. There are now less than 100 full sets available, so now is the time to order 'the big packet' or to fill in the missing numbers in your set.

We should know that Australia is a country of extremes. We're sorry that we mentioned bushfires, floods and cyclones on this page last issue, as all three have occurred since then in places where we know we have readers. To be prepared to withstand these forces of nature, we have Bob Rich's story on *The cyclone defensive house* in this issue and his advice for building precautions against floods (EG42) and bushfires (EG39).

Peace & love,
Keith & Irene.

## BOOKS & BACK COPIES

**EARTH GARDEN, PO Box 378, Epping, NSW, Australia, 2121**

***Prices include postage within Australia.***

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**HARD TIMES HANDBOOK — $7.50** .................................... $ ..............
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**The Essential Earth Garden — $15.95** .................................... $ ..............
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## 1985 SUBSCRIPTION

☐ **Please accept my subscription to Earth Garden for 1985.**
**I enclose payment of $11.00 for the four quarterly issues, EG45-48, including postage.**

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# Back copies

EG1: Move out . . . food co-ops . . . earthworms . . . Kibbutz & Moshav . . . herbs . . . Fred Robinson . . . bean sprouts . . . Montsalvat . . . organic growing . . . comfrey.

EG2: Start a garden . . . Neil Douglas in the garden . . . Keyline system . . . Kiewa farms . . . drying & storing food . . . hydroponics . . . recycling garbage . . . nutrition.

EG3: Herbs . . . making compost . . . fast fertiliser . . . all about goats . . . mudbrick making . . . water wheel . . . Teapot dome . . . bread . . . salads . . . pottery . . . spinning . . . vegies.

EG4: A pleasant treatise on the honey bee . . . working bees . . . sources . . . back to the land in Tassie . . . the transition . . . black sheep . . . tanning . . . candles . . . bread . . . domes . . . donkeys . . . wall-hanging.

EG5: The wind — windmills . . . windpumps . . . generators . . . raku pottery . . . Cinva ram . . . keeping poultry . . . Hamburghs . . . moon planting . . . vegan way . . . fallout shelter . . . just 9 acres . . . garden tools.

EG6: Solar 1 — sun cults . . . solar cooker . . . sundials . . . the lost world . . . Clifton Pugh . . . concrete house . . . Shalom . . . Cajun cooking . . . animal care . . . horses . . . spirit of Nimbin.

EG7: Solar 2 — Hot water . . . solar ideas and sources . . . good company . . . Angora goats . . . make a leather bag and belt . . . survival skills . . . mushrooms . . . natural dyes . . . mudbricks again . . . flight from the city.

EG8: Gas power — methane digester . . . power from the pig pen . . . by truck to Tassie . . . just ¼ acre . . . cumbungi hats . . . Harmony Farm . . . inkle loom . . . tapers . . . country cottages . . . a frame . . . school gardens . . . sourdough.

EG9: Alternatives to petrol — LP gas . . . Mary's place . . . building with stone rubble . . . oats . . . ducks . . . macrobiotics . . . horse and cats . . . rug frame . . . natural farming . . . how to kill a pig.

EG10: Granite house . . . bamboo flutes . . . geese . . . chip heater . . . make beehives . . . mudbricks yet again . . . Jarrah shingles . . . methane . . . Bio-dynamics . . . tandem seaweed . . . index (EG1-9).

EG11: Water — hydraulic ram . . . water wheels . . . miller's tale . . . okra . . . seed primer . . . heavy horses in Quebec . . . tomatoes . . . soft technology . . . start with hens . . . wine . . . hard cheese.

EG12: Keeping food — drying . . . salting . . . bottling . . . storing . . . mediating . . . tahu . . . tobacco . . . tropic delights . . . plant propagation . . . plans for a solar water heater (part 1) . . . solar stills . . . solar cooker . . . Moora Moora.

EG13: The bush — men with axes . . . woodchips . . . native garden . . . flora & fauna . . . national parks . . . wild places . . . wildlife . . . bushcraft . . . solar hot water plans (part 2) . . . straw & paper garden . . . producer gas . . . Jerusalem artichokes.

EG14: Self-sufficiency — gardens for all . . . Botobolar vineyard . . . Abbie's goats . . . Terania Creek . . . millet . . . Crusoe . . . Thoreau at Walden . . . Helen & Scott Nearing . . . healthy soil . . . we built in stone.

EG15: A Lytel Herbal — growing and using herbs with text and illustrations from the classic 16th century herbals with modern comentary . . . companion herbs . . . herb sources & books . . . index to EG15.

EG16: A Lytel Herbal (Part II) — comfrey, lavender, wormwood, yarrow . . . people & the land . . . poultry shed . . . Moora Moora . . . peafowl . . . goat notes . . . basic beekeeping . . . building in pise (rammed earth) . . . miracle pump.

EG17: All about fencing . . . dry stone walls . . . make nets . . . your own soap . . . Autonomous housepole shelter . . . breeding black sheep . . . owner-builders . . . asparagus . . . Aeolian harp . . . Khaki Campbells . . . D for duck.

EG18: Fruit garden — oranges . . . lemons . . . olives . . . nuts . . . tropical fruit . . . fodder trees . . . build a road . . . homebirth . . . wood-fired pottery kiln . . . Cinva-ram cottage . . . earthworms . . . hulling sunflower seeds.

EG19: Wood heat — pot bellies . . . Jotul . . . cooking . . . making a quid . . . build a storage cellar . . . bushfires . . . Sunrise Farm . . . stonefruit . . . macadamias . . . budding . . . binding your EG collection . . . tree planting.

EG20: Apples . . . pears . . . cordon & espalier . . . avocado . . . the Zolins . . . pollen . . . build a haybale pig house . . . love your cow . . . rose hips . . . the mudbrick flats . . . solar homes . . . gourds . . . preserve fence posts.

EG21: Womancraft — all articles by women . . . setting down . . . earthly arts (interview with Abbie Heathcote) . . . axewomanship . . . glove puppets . . . joy of spinning . . . time to weave . . . easy rugs . . . lambing . . . Sumatran house . . . mudbrick weekends . . . the group . . . old roses . . . index (EG10-20).

EG22-23: Australian Access 150 page sourcebook — Aborigines . . . organic food growing . . . permaculture . . . Bill Mollison . . . earth building . . . wind . . . solar . . . water power . . . solar cells . . . water supply . . . bucket pump . . . with access to groups, books, tools and techniques . . . small scale technology.

EG24: Place — 24 groups and new settlers share their place outside the cities . . . including Mare Carter . . . Ron Edwards . . . Neil Douglas . . . Gundaroo Store . . . Rainbow Region . . . Universal Brotherhood . . . Mt Oak . . . Moora Moora . . . bush ashram . . . personal stories from 20th century pioneers.

EG25: Australian Access 2 — 130 page sourcebook — livestock acquaculture . . . fencing . . . wombat gates . . . killing . . . tanning . . . food and nutrition . . . Dorothy Hall . . . a year's supply of food . . . grain grinders . . . mincers . . . methane basics . . . wind generator . . . low energy solar homes . . . greenhouse . . . more tools & techniques.

EG26: Colour spread on the earth-built kasbahs of Morocco . . . owner-builders report on homes of stone, timber and mudbricks . . . build a slab cottage . . . tree felling . . . two solar-electric homes . . . Earth Garden survey . . . survival vineyard . . . acorns . . . fruit without poisons . . . compost dunny . . . home-made gas . . . quandong . . . pumpkin recipes.

EG27: Plants we eat — 100 tropical food plants for Australia (part 1) . . . plant protein . . . 16 legumes to grow & eat . . . like winged bean . . . pigeon pea . . . lablab bean . . . cowpea . . . sword bean . . . chickpea . . . sugar pea . . . mung bean . . . soybean . . . adzuki bean . . . life-raft . . . blacksmithing . . . bluestone building . . . mudbrick solar home . . . wok cookery . . . choko . . . homebirth.

EG28: Animal stories — by packhorse through the Victorian Alps . . . horse & buggy . . . Mary's black sheep . . . the woolly Merino . . . Timbertown bullocky . . . tropical food plants for Australia (part2 ) . . . stringybark baskets . . . tamarillo . . . buying bees . . . solar trike & fan . . . make a poker . . . persimmon . . . seed patents.

EG29: Mudbrick primer — the monastery at Stroud . . . six builders & their mudbrick experiences . . . mud barbecue . . . Bob's bonza brickmaker . . . earth floors . . . curved walls . . . herbs on the roof (sod it!) . . . low energy design . . . the cutting axe . . . food plants for tropical Australia (part 3) . . . coconut mats . . . mango mania.

EG30: Organic growing guide . . . the organic idea . . . food without poisons . . . making compost in heaps, pits, trenches, boxes, bins & barrels . . . carpet the garden . . . wot no digging? (mulch it instead) . . . organic methods for the semi-arid West . . . compact growing boxes . . . a traditional farmer . . . preserving figs . . . tasty tempeh . . . the Bornhoffen story . . . pasta . . . glass bottle mosaics . . . trickle watering.

EG31: Energy alternatives at work — make your own hydraulic ram . . . second-hand windpump . . . mudbrick sequels . . . freezing food . . . blanching . . . choosing a freezer . . . zucchini glut . . . drying fruit . . . all about sprouts . . . fireless cookers (hot boxes and baskets) . . . camp oven . . . growing greens in the wet . . . building a log house (part 1) . . . index (EG21-EG30).

EG32: Trees — tribute to trees . . . St Barbe Baker . . . tree tales . . . how a tree works . . . the miracle of a leaf . . . native trees from seed . . . trees on the farm (interview with Tim Cox) . . . forestry directory . . . dieback . . . renewing the land . . . coppicing . . . the woodchipper blade . . . value of trees . . . artist in the bush (interview with Neil Douglas) . . . low-cost country home building . . . cob does the job . . . building a log house (part 2) . . . square foot gardening.

EG33: Tenth anniversary issue . . . use of wood . . . timber felling . . . lifting poles . . . post-and-beam design . . . building a log house (part 3, concludes) . . . parquet floors . . . backyarders' livestock . . . goats . . . rabbits . . . fowls . . . portable hen-house . . . dandelions . . . wild tea party . . . bush regeneration . . . planning figs . . . dry pit loo . . . blackberry-eating beetle . . . weeding tools.

EG34: A look at China (extra colour photos) — the commune system . . . teaching the masses . . . trees of friendship . . . forestry . . . fish farming . . . recycling human wastes . . . biogas . . . transport . . . travel notes . . . Ron Edwards writes on earth building the Chinese way (and tea) . . . making the farm pay . . . places . . . bread & jam . . . rainforest . . . eco-gardening.

EG35: Bees and trees — Tributes to Richard St Barbe Baker . . . tree tales . . . backyard bees . . . hiving a swarm . . . St Barbe's bees . . . a beginner's kit . . . beekeeping books, equipment, clubs and information . . . nectar-yielding eucalpyts . . . self-build housing . . . mudbrick workshop . . . earth wall footings . . . make your own solar collector . . . a good workdog . . . magpies . . . wormiculture . . . nuclear nightmare . . . waste to compost . . . fodder trees.

EG36: Settling in at Nimbin — glimpses of Nimbin . . . settler's tales . . . interview with with a woman builder . . . handbuilt homes . . . a pawpaw plantation . . . simple, cheap, solar electric systems . . . passive solar 'rules of thumb' . . . biological building . . . farm sructures . . . a potty garden . . . choughs . . . bush birds . . . the inn at Ollantaytamboo, Peru . . . more fodder trees . . . make a lavender sachet . . . the food page . . . nuclear-free Australia?

EG37: Hard times — sidestepping the recession . . . new paper from old . . . newspaper fuel . . . rags to rugs . . . barter . . . when the lights go out . . . slush lamps . . . sawdust stove . . . tin can cooker . . . the hungry 30s . . . Depression dodges . . . Happy Valley humpies . . . hand grain mills . . . 120 money-saving hints . . . make soap . . . whitewash . . . polishes . . . cleansers . . . glue . . . insect repellents . . . passive solar design . . . roof ponds . . . donkeys at work.

EG38: Access survey — where to buy alternative energy equipment . . . electric grain grinders . . . Hard Times tucker . . . back to basic bread . . . steam cooking . . . sustaining soups . . . no-meat meals . . . solar dried bananas . . . yoghurt . . . summer cheese . . . cheap meat meals . . . home-brewe beer . . . coofee form tree to cup . . . a Gujarati village . . . Noel's Island . . . Wild Country Park . . . Depression days . . . earth walls and bushfires . . . mudbrick hermitage . . . the electromagnetic house (building biology) . . . Self-Build success . . . Hondas on the farm . . . sweet cherries . . . winter in the vineyard.

EG39: Alternative technology — low-voltage small-scale . . . run lights and TV from your car battery . . . Peter Pedal's bicycle wheel wind generator . . . farm energy system . . . fire without matches . . . mushfire defensive house . . . earth building notes . . . the indoor climate (building biology) . . . backyard food growing . . . a sense of humus . . . try herbs . . . rosehips . . . avocado growing guide . . . laying out a farm . . . the vineyard in spring . . . dairy notes, 1898 . . . bread happiness . . . old-time household hints.

EG40: Communities — "constructive alternatives" . . . Communiversity . . . village in the making . . . start a food co-op . . . making the co-op work . . . three in a caravan . . . Scott Nearing — a good life . . . how we make cyder in Tasmania . . . trees for fire protection . . . tree planting at Undalya . . . the self-built house . . . The Muddies Manual . . . raw earth . . . earth floors . . . bushfire resistant housing . . . boiling the billy . . . hares . . . tetanus . . . laying out a farm (part 2) . . . olive oil . . . cashew nuts.

EG41: Wandering — across the Sahara . . . Uganda . . . in Australia with pack donkeys & by horse float . . . the lure of Timbuktu . . . adventure travel access . . . Sahara mat-tents . . . Moora Moora 10 years on . . . build a Savonious rotor bike wheel wind generator (Peter Pedals) . . . energy access . . . yeastless breads . . . dampers . . . build a shadehouse . . . food co-op books . . . recipes for real potatoes . . . sheep stories . . . index, EG31-40.

EG42: Building — earth-covered homes . . . the Burra dugouts . . . our stone home (slipform technique) . . . flood-defensive house . . . build a Chinese pigsty . . . mudbrick notes . . . compost power (methods of Jean Pain) . . . tomato tips & treatment . . . herbal insecticides . . . deep ecology . . . EG reader survey . . . breaking in the Fergy . . . earth travel . . . the Tuareg . . . bourgeois communes!

EG43: Earth domes & vaults — Eukey pink palace . . . rendering earth walls . . . bush stone masonry . . . mudbricks . . . farm systems . . . bush shower . . . Peter Pedals' Pelton wheel & incinerator hot water . . . remote power systems . . . low voltage wiring . . . sheet metal pans . . . sheep . . . donkeys . . . horses . . . farming with wildlife . . . Daintree . . . travelling with kids . . . energy access.

EG44: Plug in the sun — solar electric systems . . . 12V to 240V systems . . . first-hand reports . . . solar panel booster . . . the Solar Trek . . . batteries . . . inverters . . . alternative washdays . . . Peter Pedals on petrol, Pelton wheel & pedal-driven washers, how to make a pedal drier and 12V computers . . . beans for fish . . . using water wisely . . . outdoor cookstove . . . Mebbin Springs . . . greens for the fowls . . . mudbrick methods . . . sheepskin rugs . . . Keith & his Mac. More!